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INDIA RUBBER WORLD

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OUR 64th YEAR

A BILL BROTHERS PUBLICATION

DECEMBER, 1952

There's a DU PONT AQUAREX®

to fit your specific requirement

MOLD LUBRICANT

WETTING AGENT

LATEX STABILIZER

AQUAREX ME—A dry powder with *minimum* electrolyte content. For different latex compounding jobs, where electrolyte in any form may cause flocking, *Aquarex* ME can be used to give the necessary stability. Dilute solutions of *Aquarex* ME provide excellent mold release and the residue build-up is extremely small.

AQUAREX WAQ—An aqueous paste with the same low electrolyte content as *Aquarex* ME. If processing procedures permit the use of a paste product, cost savings may be realized without sacrificing any advantage of *Aquarex* ME.

AQUAREX SMO—Developed specifically for use in neoprene latex as a surface conditioning agent, *Aquarex* SMO is particularly effective in improving the smoothness and gloss of films deposited from neoprene latex compositions. *Aquarex* SMO can also be used to eliminate striations which sometimes appear when films are dipped from thick, heavily loaded neoprene latex compounds.

AQUAREX NS—An amphoteric stabilizer, especially suited for stabilizing latex against flocculation where neutral or slightly acid ingredients are required to obtain desired physical properties in the finished product.

AQUAREX D—Where a higher electrolyte content can be tolerated, *Aquarex* D can be used in place of *Aquarex* ME, although it is not as economical. It is also a good mold release agent, but results in faster mold residue accumulation than *Aquarex* ME.

AQUAREX MDL—An aqueous paste which can be used to replace *Aquarex* WAQ when a slightly higher electrolyte content can be tolerated. *Aquarex* MDL is somewhat more economical to use than *Aquarex* WAQ.

Further information on Du Pont *Aquarexes* will be found in Bulletin 51-2. Extra copies are available. Write to the district office nearest you.

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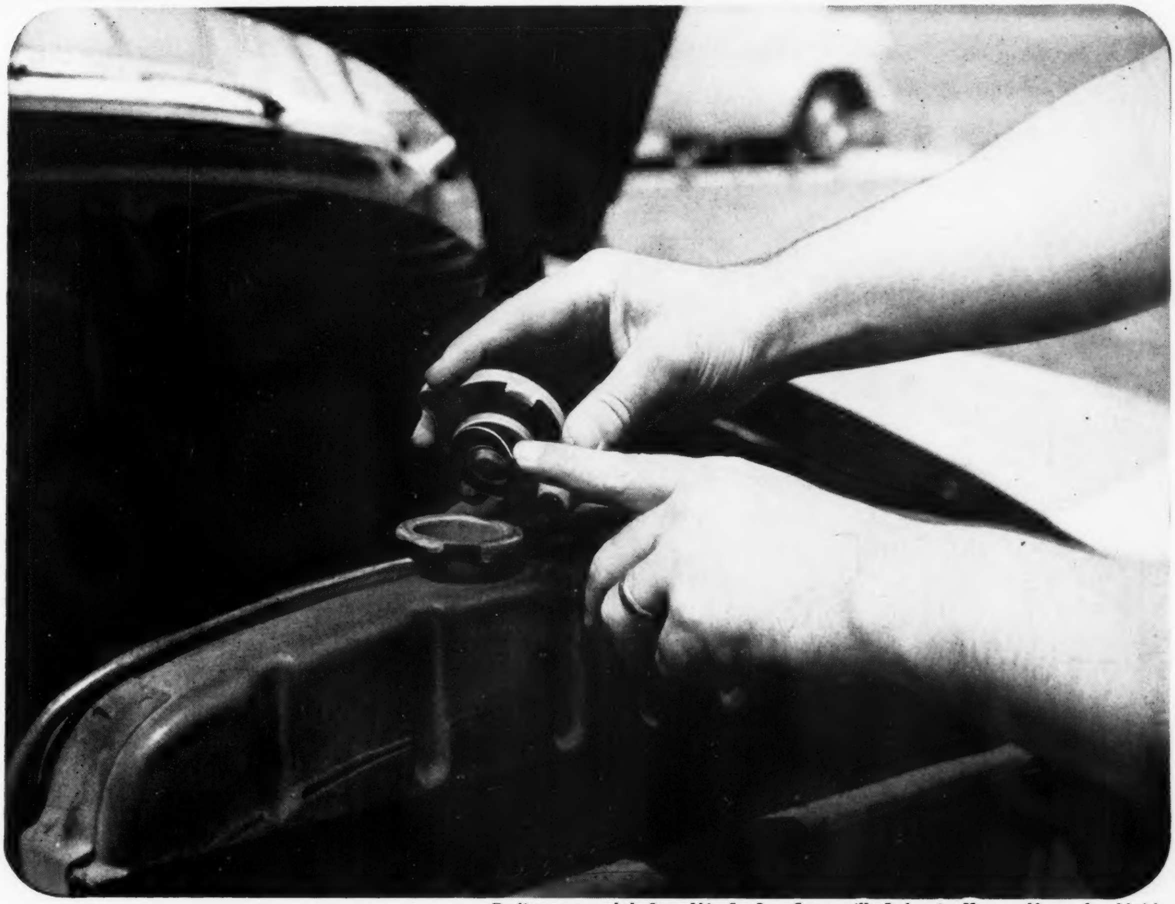
150th Anniversary

BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

INDIA RUBBER WORLD, December, 1952, Vol. 127, No. 3. Published monthly by BILL BROTHERS PUBLISHING CORP. Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Orange, Conn., under the act of March 3, 1879. Subscription United States and Mexico, $5.00 per year; Canada $6.00; All Other Countries $7.00; Single Copies 50 Cents. Address Mail to N. Y. Office.

Another new development using

B. F. Goodrich Chemical *raw materials*



Radiator cap made by Stant Mfg. Co., Inc., Connersville, Ind., using Hycar rubber seal molded by Acadia Synthetic Products, Chicago, Ill. B. F. Goodrich Chemical Co. supplies the Hycar rubber only.

NEW CAP KEEPS PRESSURE UNDER CONTROL

and Hycar helps!

HYCAR rubber even helps pressurized cooling systems operate efficiently now! For it has all the advantages needed to help the radiator cap pictured provide a perfect seal.

The manufacturer had to have a sealing material that would not stick to the brass radiator filler neck after long contact under spring pressure and heat or moisture. Sticking would prevent the control valve from opening under low pressures.

But that wasn't all. The material also must not swell, shrink, soften or harden under severe service. Hot and cold water, alcohol or chemical-based anti-freeze solutions must not affect it. Nor abrasion produced by fastening or removing the cap.

Hycar nitrile rubber provided the answer to every requirement. For Hycar resists extreme temperatures, oils, acids, many chemicals and abrasion. Its good compression set properties and resistance to cold flow further insure a perfect sealing action.

Hycar rubber compounds are used in many ways—to solve a troublesome problem, or help improve products to bring in more sales. Perhaps they can help you. For technical information and advice, please write Dept. HB-6, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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gives Maximum Protection for light-colored rubber!

This specially developed *new* antioxidant gives rubber products *excellent* protection against heat, oxygen, and flexing fatigue—with a *minimum* of discoloration and staining.

Now you can protect carcass stocks for white sidewall tires—without fear of staining by migration. Use Octamine in light-colored stocks for footwear, sponge, molded soles and heels, wire insulation, mechanical goods—wherever you need strong antioxidant protection without objectionable discoloration.

Octamine is a granular, waxlike solid that is easy to handle and disperses readily. Since it is a true secondary amine, it functions equally well with or without carbon blacks. It has good storage stability, requires no handling precautions, is non-blooming, and has no appreciable effect on rate of cure.

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MILL END. The Akron-Standard automatic batch-off machine ready to receive milled stock.

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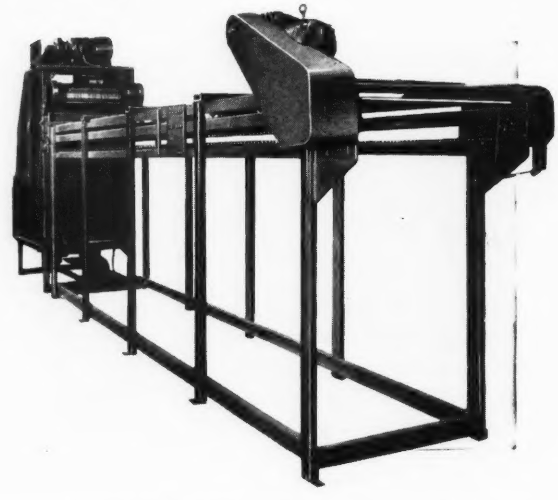

BATCH-OFF END. Rack-loading end and festoon rack in position to receive milled slab.

Ask for our well illustrated 36-page Bulletin "W", describing this and many other types of profit-making Akron-Standard equipment.

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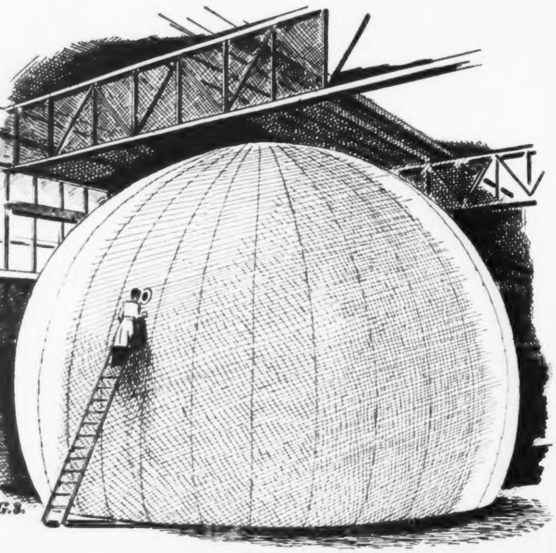

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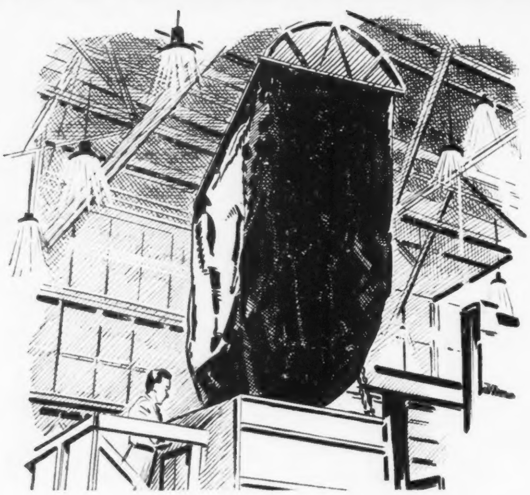

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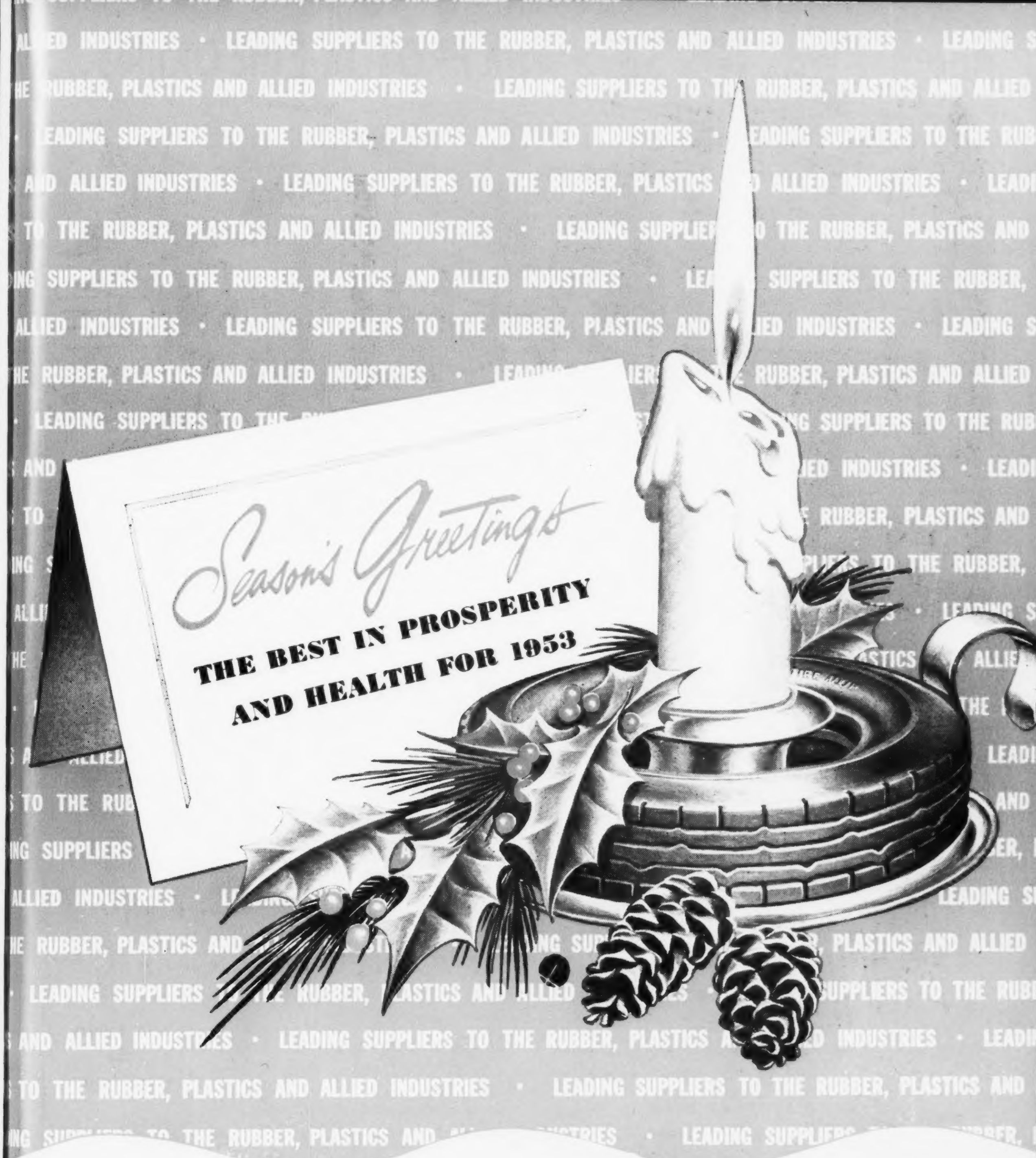

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60 bags ($1\frac{1}{2}$ tons) of Protox-166 (left) make a compact, stable load. But a like amount of conventional zinc oxide packaged in the usual way (right) is unmanageable—must be cut to about 40 bags. Thus you haul as much in 2 loads of Protox-166 as in 3 loads of other oxides.

Cut Handling Costs Up to 33% with Protox

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You can load more Protox Zinc Oxide on your skids or pallets because:

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b. Our special method of packing Protox (as unit loads) likewise lowers the dry bulking

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*U. S. Patents 2,303,329 and 2,303,330

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... most used by rubber manufacturers since 1852

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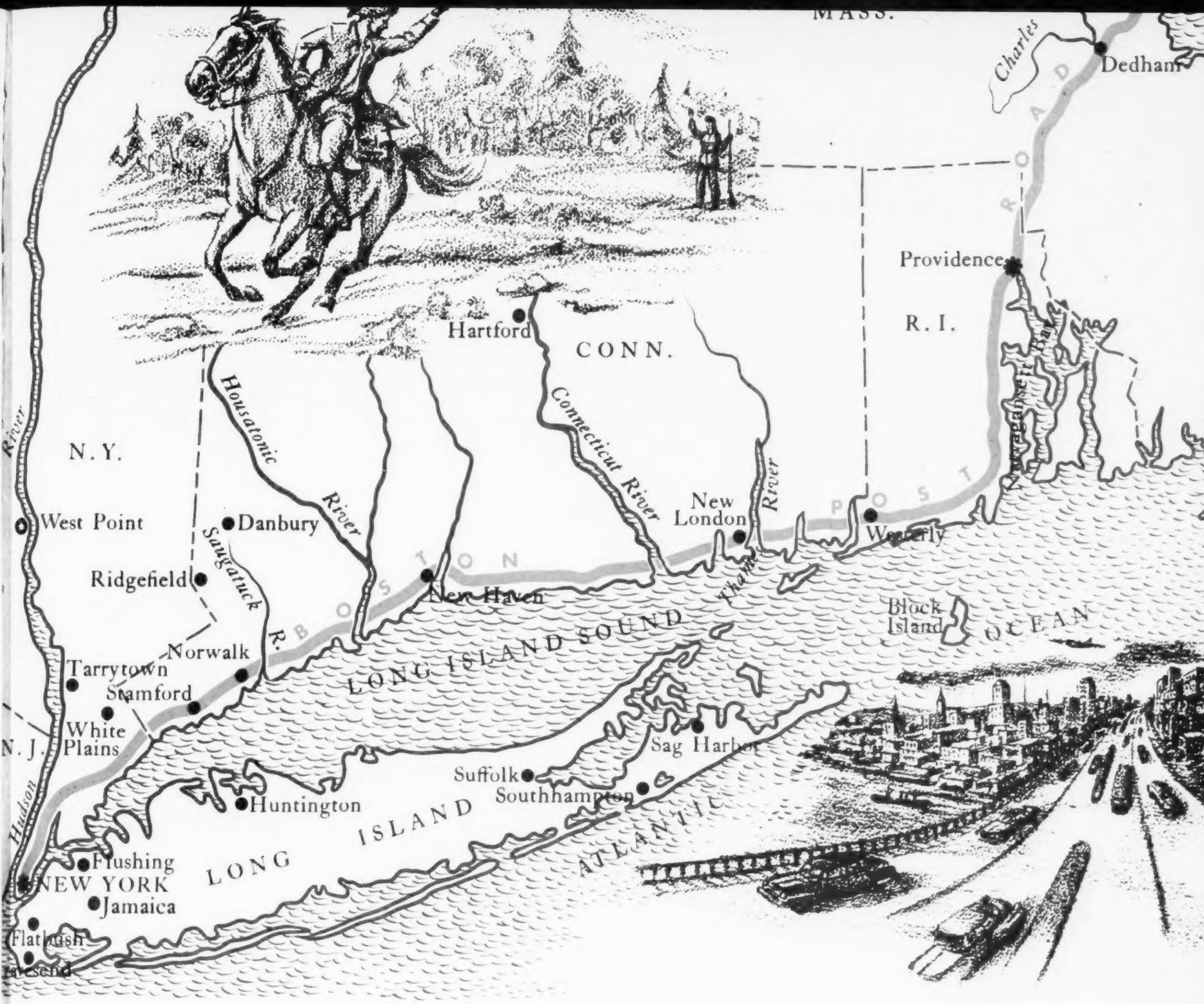

One in a Series of Famous Trails, a Reminder of Man's Progress in Transporting Himself and His Products.

Boston Post Road

A score of years after the *Mayflower* landed, there were 20,000 people living in New England in clusters of separate little communities, connected by Indian trails and water travel. In 1639, the Massachusetts General Court provided for a road between Boston and Plymouth. This small stretch of road became a part of one of the most famous highways in America. The Boston Post Road, which connected Boston with New York. The Boston Post Road is now part of the famous U. S. Route 1, which follows the Atlantic coastline from Maine to Florida.

On January 22, 1673, the first post galloped northward from New York on a mission from the Governor of New York to create good will and understanding between the two settlements. The first mailman in America took three weeks to make the 250-mile trip; in 1772, the first trip was made by public conveyance, or stagecoach, though wagons hauling freight from city to city began to appear early in the 18th century.

George Washington, rushing from Philadelphia to Boston in 1775 to take command of the Continental Army was 12 days in making the journey.

How far man has come in his ability to transport himself and his products! Days of laborious travel have been reduced to hours, and minutes. Indian trails and primitive roads have given way to a network of highways which have eliminated remoteness from every section of the land.

And wherever man goes, and wherever the products of his labor, farm or factory are shipped the rubber tire is his fast and dependable servant in transportation.

. . . .

There came a time in the development of the rubber tire when it was discovered that the addition of carbon black gave a strength and durability previously undreamed of. Tire manufacturers thus supplied a product equal to the transportation needs of the day.

United Carbon, Inc., was one of the early producers of dependable carbon blacks for the rubber industry. It has kept in advance of the needs of the industry, supplying tire producers with carbon blacks geared to their needs and requirements.

UNITED CARBON COMPANY, INC.

Dixie 60 is a High Abrasion Furnace (HAF) carbon black that is earning top rating for better processing, high reinforcement, and noteworthy resistance to abrasion.

Dixie 60 is scientifically produced from special fuel in a most modernly designed furnace plant. Its manufacture is constantly controlled to yield a highly uniform carbon black of assured quality for the rubber industry.

Ease your tread problems with Dixie 60.

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BY THE TRAINLOAD IF YOU WANT IT!

PICCOPALE is a completely new synthetic resin, offering many money-saving and product-improving advantages. It is chemically inert—not affected by acids and alkalies; it is moisture-proof; its initial color is good and stability is fair; it is compatible with a very wide range of products, including waxes, rubbers, polyethylene, coumarone-indene resins, phenolics, rosins and esterfied rosins, many alkyds and vinyls, and most drying oils. PICCOPALE is soluble in naphthas, chlorinated solvents and long-chain oxygenated solvents.

PICCOPALE is available in enormous quantities—by the trainload if you want it—and priced so low that it can be used as a basic raw material.

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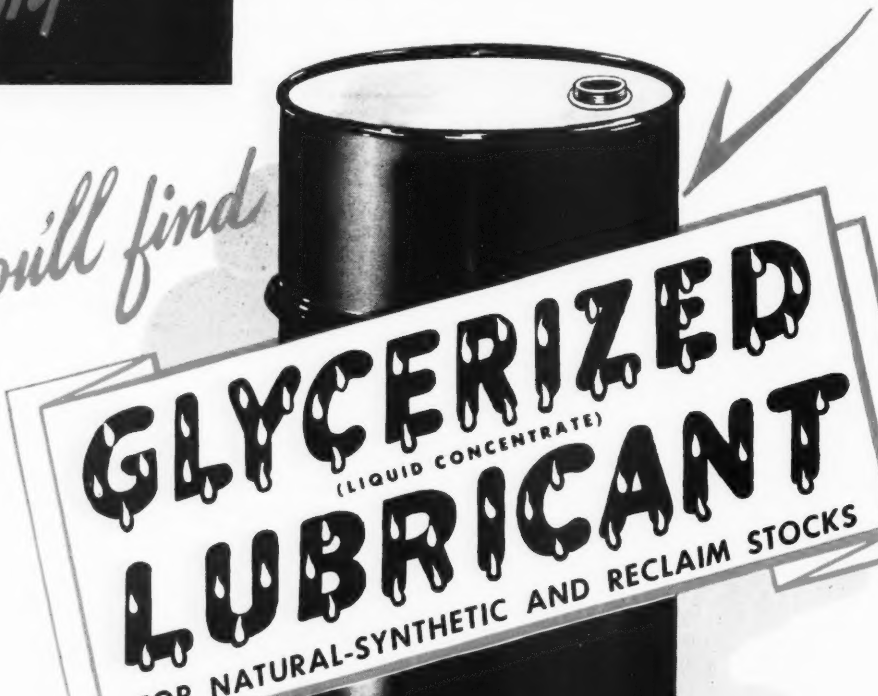

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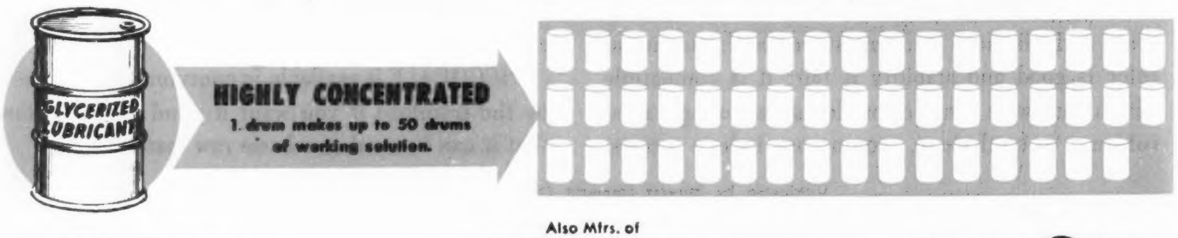

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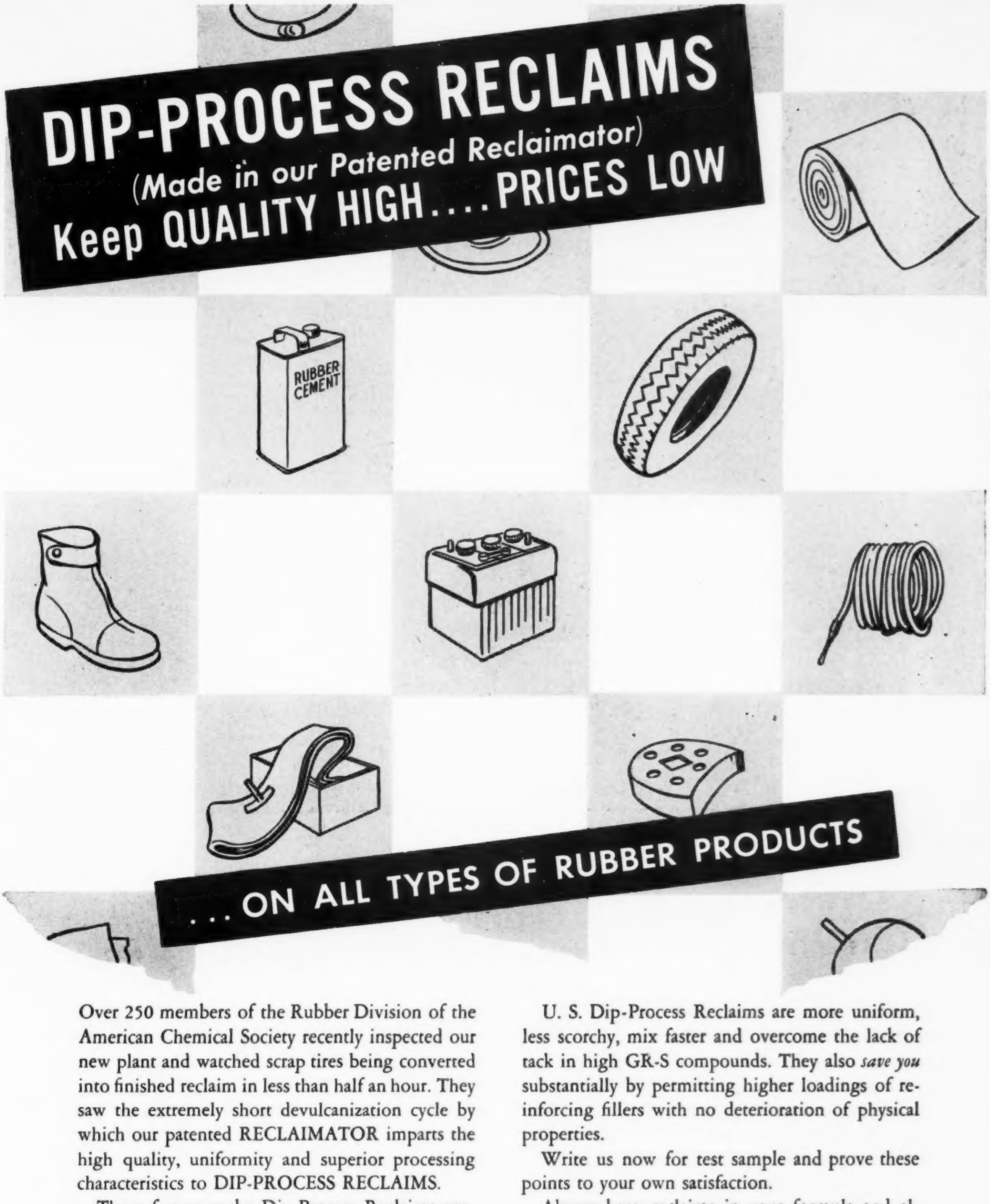


Over 250 members of the Rubber Division of the American Chemical Society recently inspected our new plant and watched scrap tires being converted into finished reclaim in less than half an hour. They saw the extremely short devulcanization cycle by which our patented RECLAIMATOR imparts the high quality, uniformity and superior processing characteristics to DIP-PROCESS RECLAIMS.

These factors make Dip-Process Reclaims preferred for most applications, This demonstration directed the attention of rubber technicians to the greatest advance of the past fifty years in reclaiming of vulcanized rubber.

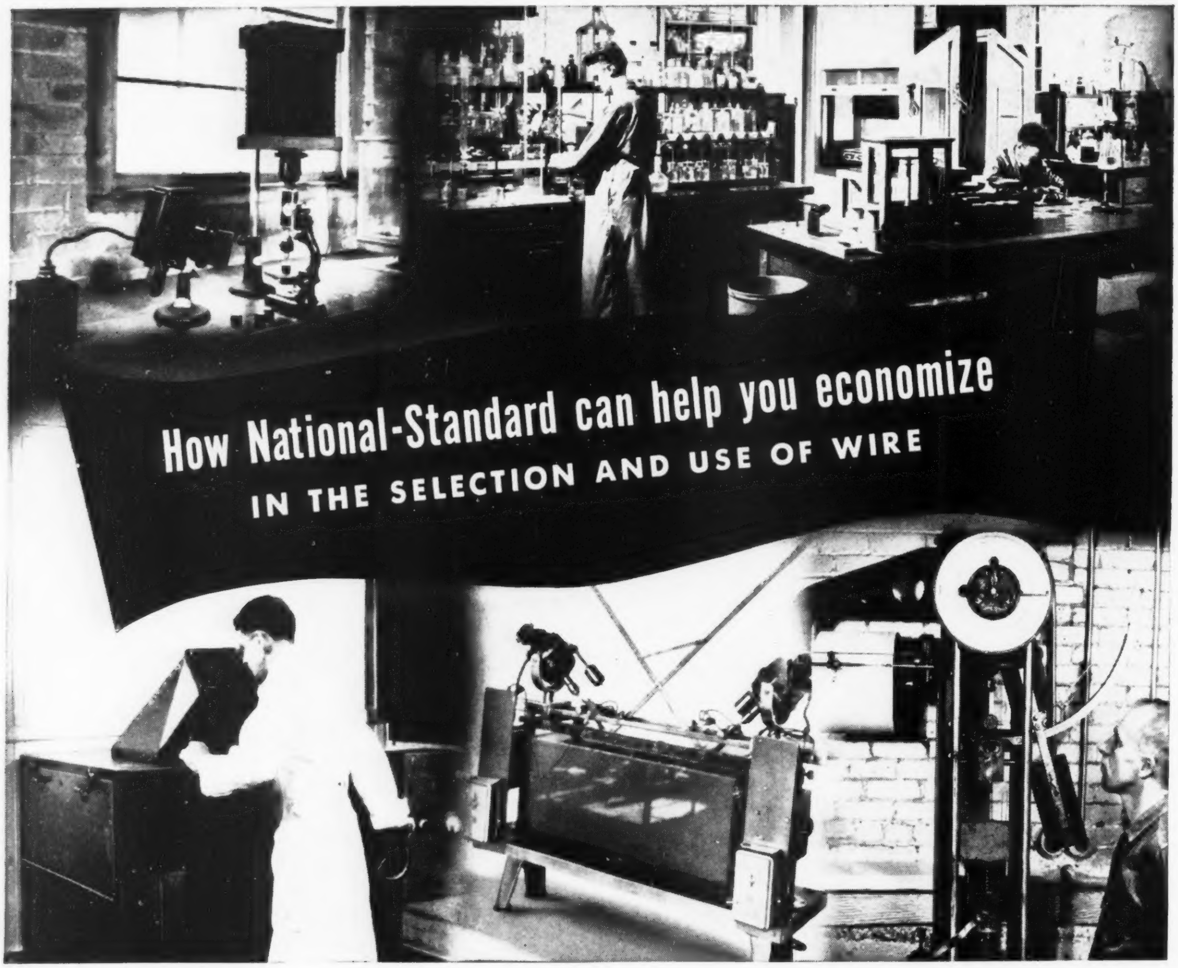
U. S. Dip-Process Reclaims are more uniform, less scorchy, mix faster and overcome the lack of tack in high GR-S compounds. They also *save you* substantially by permitting higher loadings of reinforcing fillers with no deterioration of physical properties.

Write us now for test sample and prove these points to your own satisfaction.

Always keep reclaims in your formula and always look to U. S. for the best. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y. Trenton agent: H. M. Royal, Inc., 689 Pennington Ave., Trenton, N. J.

69 years serving the industry solely as reclaimers

U.S. RUBBER RECLAIMING COMPANY, INC.



A standard offer of service

THERE may be ways in which you can save a "penny" here and there in producing your tire beads, hose, belts or other wire-in-rubber products. National-Standard engineers, who have contributed cost-saving suggestions in many a rubber plant, always welcome the chance to help you find out.

For here at National-Standard we've spent a lifetime studying and improving the behavior of wire in rubber—digging into all the intricacies of application, fabrication, finish, corrosion, strength, adhesion and innumerable details you might never bother with.

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No water extraction
Best color retention
Positive antioxidant protection

with *Wing-Stay S*

IN FISHING lures, bathing caps, surgeons' gloves—wherever light-colored or white rubber products are washed, sterilized or just immersed in water – it pays to use WING-STAY S for antioxidant protection. For under ordinary conditions, this antioxidant is *never* removed by water. This assurance of lasting protection is coupled with the best color retention – all at surprisingly low cost.

If you are now using any of these GR-S rubbers—1006, 1012, 1502 or X693 – you already have these advantages of WING-STAY S working for you. For since August 1951, more nonstaining GR-S has been made with WING-STAY S than with all other antioxidants combined.

You can safely turn to this use-proved antioxidant, thanks to large production facilities that assure you of a dependable supply. Write for further details to:

Goodyear, Chemical Division, Akron 16, Ohio

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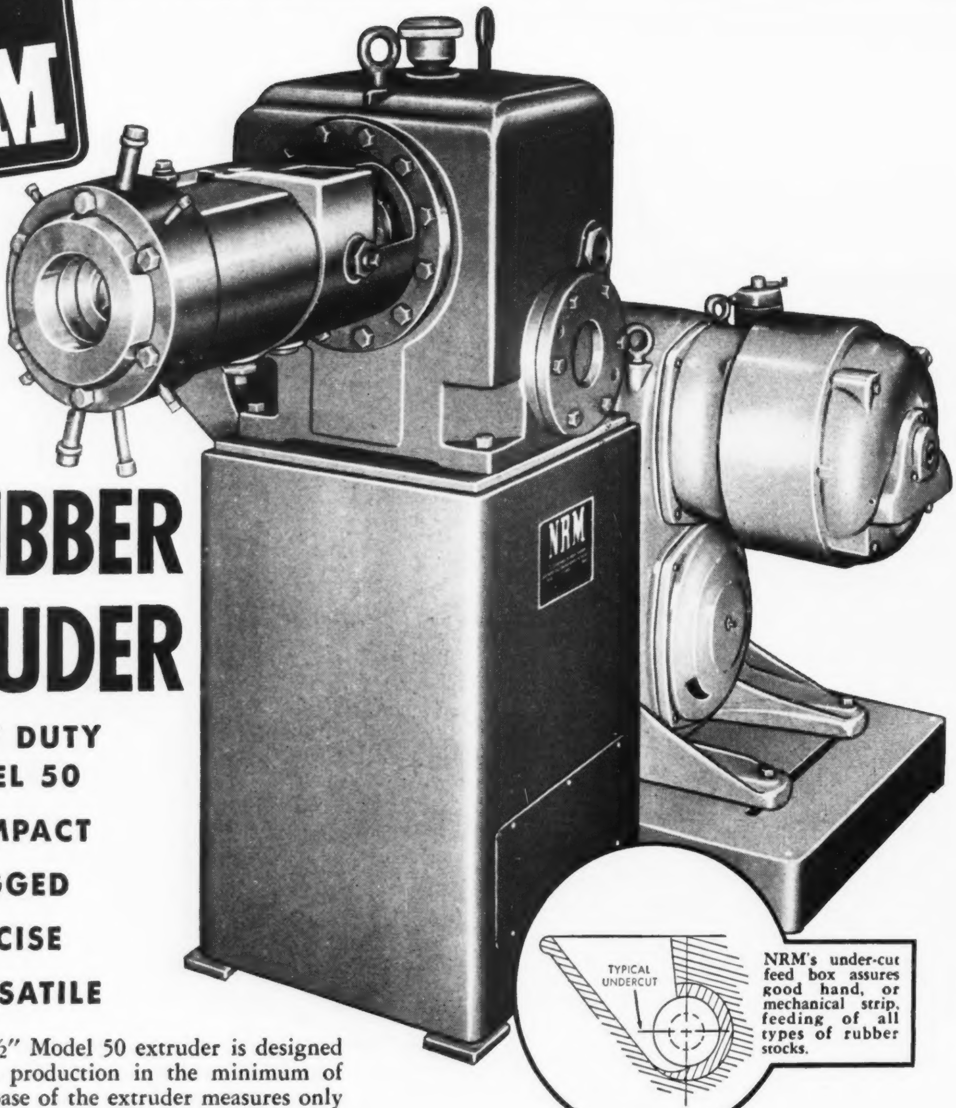
NRM



2½" RUBBER EXTRUDER

HEAVY DUTY MODEL 50

- COMPACT
- RUGGED
- PRECISE
- VERSATILE

NRM's new 2½" Model 50 extruder is designed to give the most production in the minimum of floor space. The base of the extruder measures only 19" x 23½". Its overall length is only 47¾". Its height is just 53⅛". Yet, it has a nominal capacity of 200-250 lbs. per hour and is ruggedly built to give years of trouble-free service.

The Model 50 carries all of the features that have made NRM extruders first choice for high quality, precise extrusions of all types of rubber compounds. The under-cut feed hopper — the heat treated alloy steel feed screw with hardened flight surfaces — the accurately machined cylinder with replaceable Xaloy liner — the heavy duty cone worm gear reduction unit — the extra heavy thrust and radial bearings — the sturdy fabricated steel base — all combine to give maximum, uniform production at minimum cost.

Look into the Model 50, today. Just a postcard will bring full information — promptly and without obligation.

2083

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NRM

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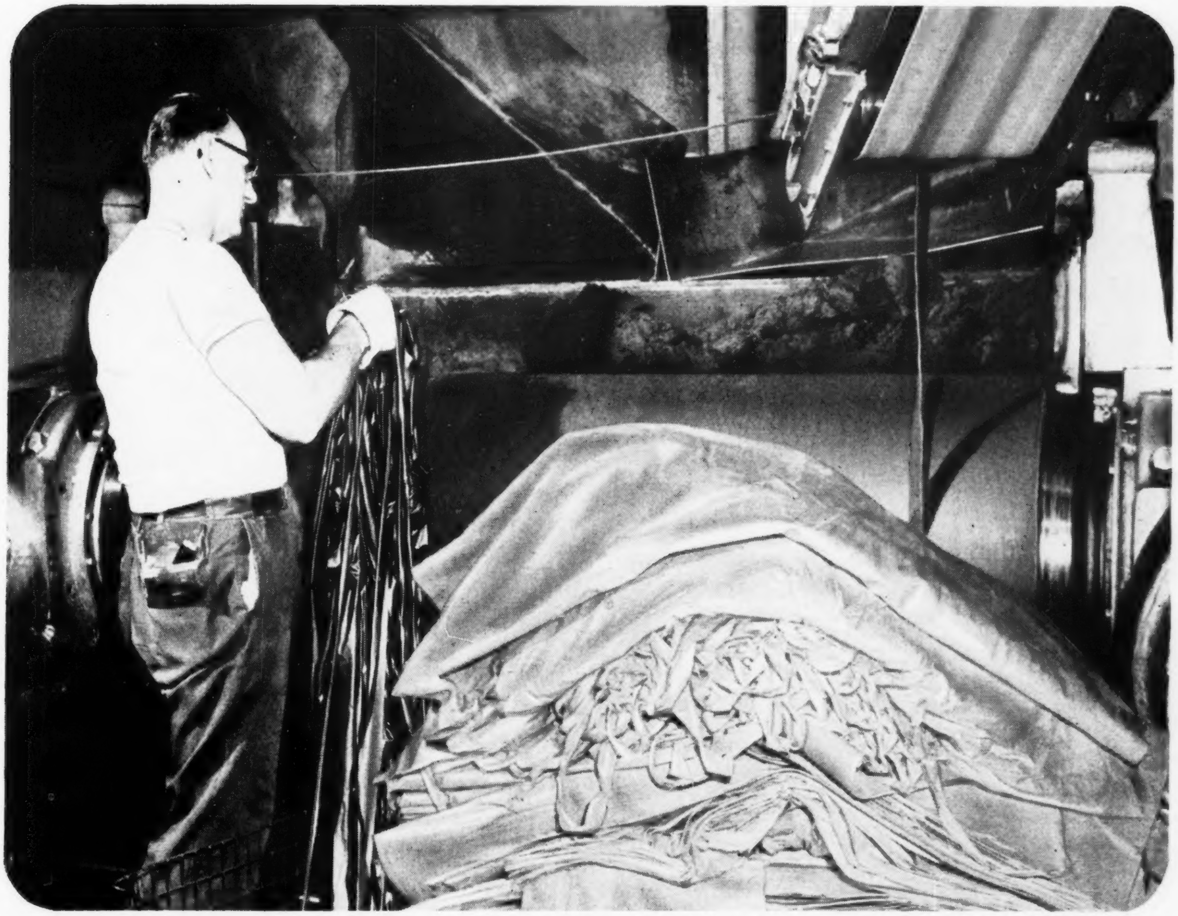
Creative Engineering

Cut your scrap loss with Pliovic



Re-runs of trim like this are easy with PLIOVIC G90V

YOU will find—as many vinyl processors have already discovered—that you get less scrap, more re-usable trim, tailings and ends when you turn to PLIOVIC G90V—Goodyear's new polyvinyl chloride resin.

That's because PLIOVIC G90V has outstanding heat stability—giving less degradation and loss of physical properties when reworked. It also permits high calender speeds and fast extrusions that mean more production.

PLIOVIC G90V has a high uniform bulk density for ease in handling—good color for use in clear or pigmented compounds—and can easily be compounded for use in a wide range of products.

First in a series of polyvinyl chloride resins, PLIOVIC G90V is another use-proved product by Goodyear. Write for full details today to:

Goodyear, Chemical Division, Akron 16, Ohio

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EXPERT REBUILDING

The Right Answer

To Proper Maintenance of Your

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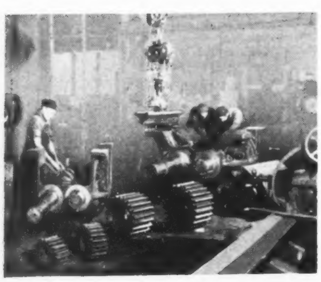
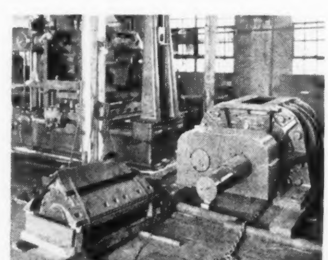
You who work with Banbury Mixers, and are charged with their maintenance, and the efficient flow of production, know first hand the task it is to overcome the wear caused by steady use.

Interstate Service holds the right answering to any problem of rebuilding your Banbury body and restoring your mixer to top efficiency.



You can INTERCHANGE your old mixer body for one of ours, already completely rebuilt—or you can use our "PRE-PLAN" method to have your present body rebuilt and returned to you.

Either way YOU SAVE valuable weeks of production time. Our rebuilding facilities handle every size Banbury, and we can fabricate any of the parts for any mixer.



Now more than ever you can benefit from Interstate's seventeen years specialized experience in rebuilding and hard-surfacing Banbury bodies. Write for details and prices. One of our engineers will call at your plant and inspect your installation at your request.

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Wherever close tolerances, physical properties and good appearance must be maintained, along with outstanding resistance to heat aging, oils, greases and solvents, you can count on CHEMIGUM. This use-proved Goodyear synthetic is the easiest-processing nitrile rubber you can use.

Ask for full details today by writing:

Goodyear, Chemical Division, Akron 16, Ohio

Chemigum, Pliobond, Pliolite, Pliovic—T. M.'s
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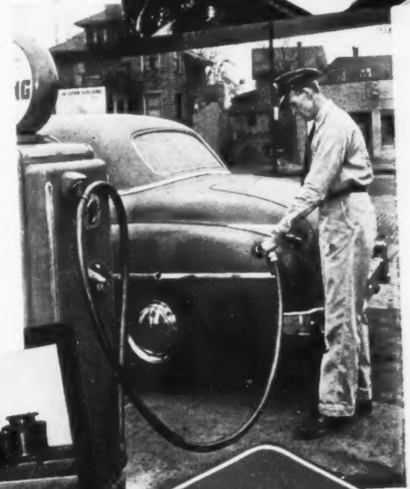

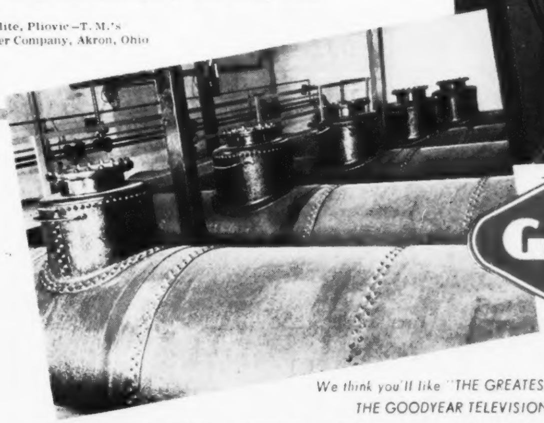

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We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network
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Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

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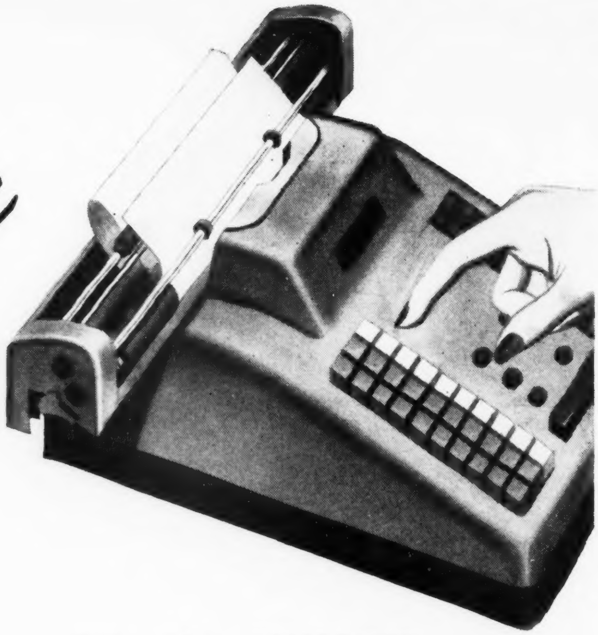
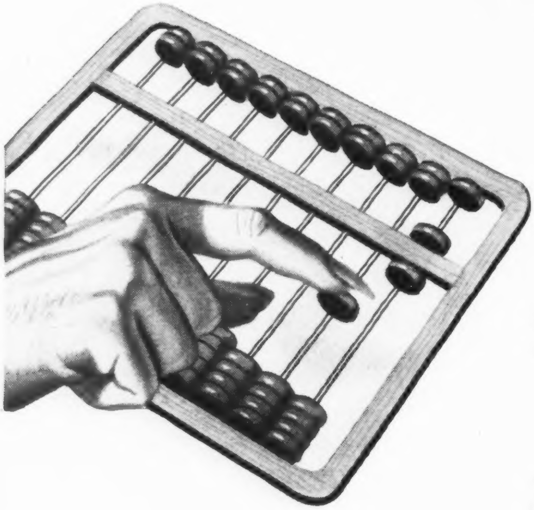




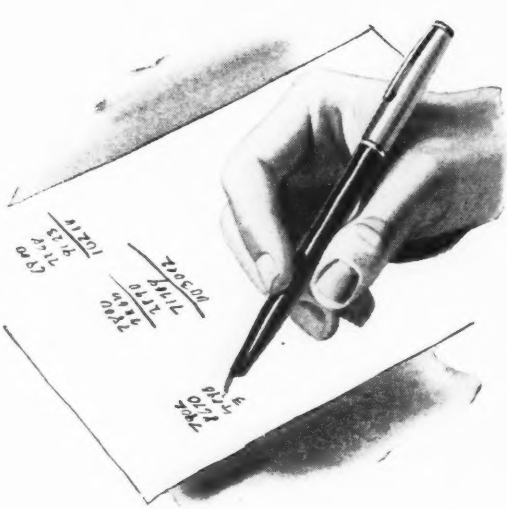
It's the FINISHED COST that counts!

SURFEX® MM can give your vinyls all these advantages—at no greater cost than for water-ground limestone:

- BETTER LIGHT STABILITY
- REDUCED MIXING TIME
- LESS WEAR ON DIES
- CONTROLLED CHEMICAL ANALYSIS
- LOW IRON CONTENT

Check the pound/volume comparison at right to see how SURFEX MM, a controlled quality precipitated calcium carbonate, can help you lower vinyl compounding costs and increase batch yields with no sacrifice in quality.

Write for your copy of "The Application of Inert Fillers in Vinyl Plastics".



YOU GET ALL OF SURFEX MM's ADVANTAGES AT NO EXTRA COST

	COST/LB	RECIPE	
PVC RESIN	$0.38	100	100
DOP	.42	57	57
SURFEX MM	.0185	35	—
W-G Limestone	.009	—	34
Stabilizer	.57	3	3
Lb./Volume Cost	—	45.2c	45.2c
Durometer Hardness	—	85	85
Tensile	—	2400 psi	2200 psi
Crescent Tear	—	400 lbs/inch	350 lbs/inch

DIAMOND SALES OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, St. Louis, Memphis and Houston. Also, representatives in other principal cities.

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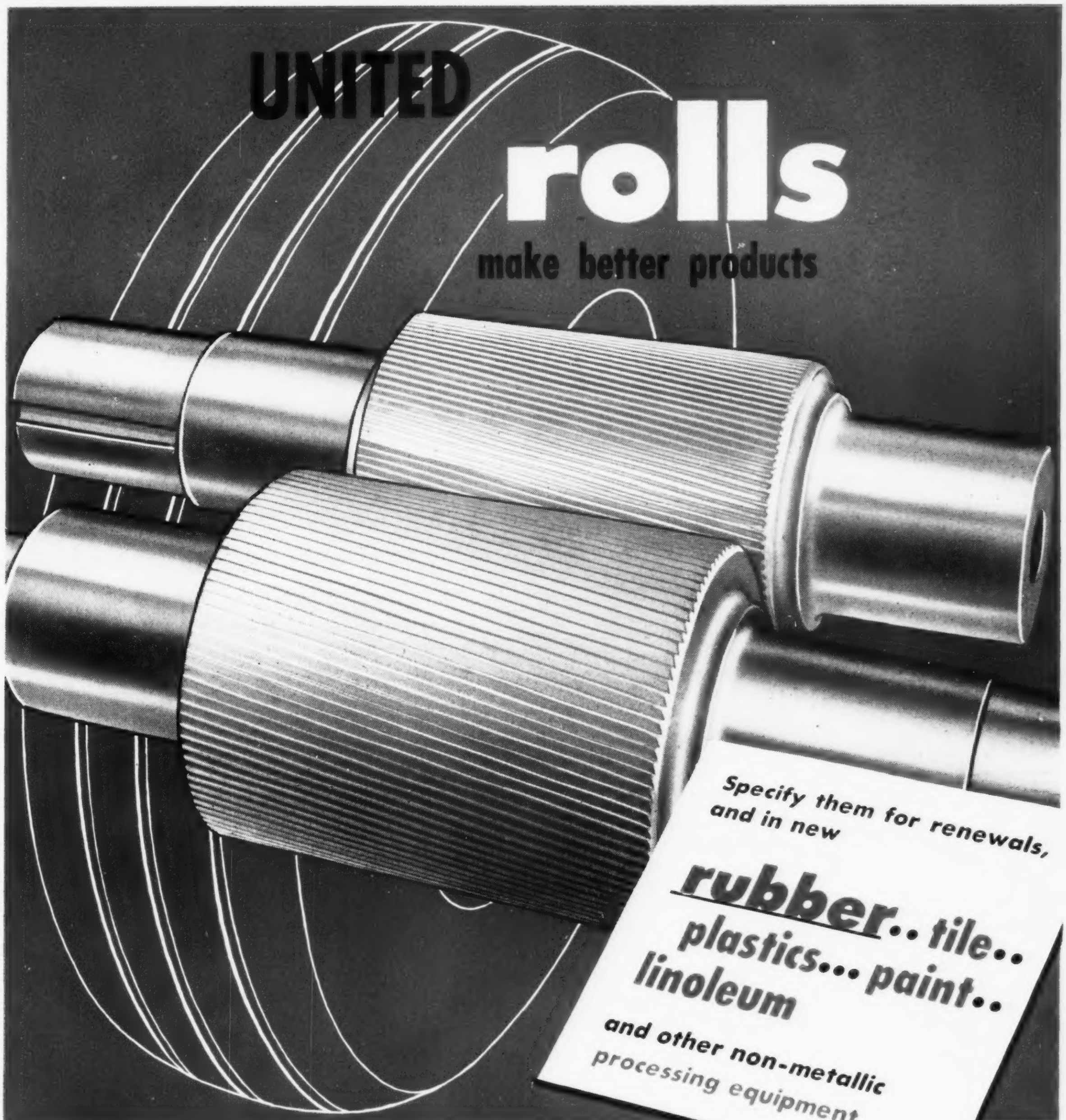

Experience, a necessary ingredient in the manufacture of any product, is especially essential in roll making where only by long and intimate association with an industry, can its requirements be thoroughly understood and successfully provided for.

To United's 50 years of roll making experience can be added the advantages of its continuing program of metallurgical research, basically sound engineering and modern production facilities—a combination that made, and has kept, United Rolls favorites in outstanding processing plants throughout the world.

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When in need of rolls—for whatever requirement—consult us.

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'TUF-GRIP' is available with short or long periods of "tack life."
'TUF-GRIP' is available in clear or colors inlcuding black and white.
'TUF-GRIP' is thoroughly dependable and it's tough!

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EXTENDED 'TACK LIFE'...

'TUF-GRIP'

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SOLVENT TYPE CEMENTS

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Our products are engineered to fill every need in natural and synthetic rubber compounding wherever the use of vulcanized oil is indicated.
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Oldest and Largest Manufacturers of "Factice" Brand Vulcanized Oil Since 1900

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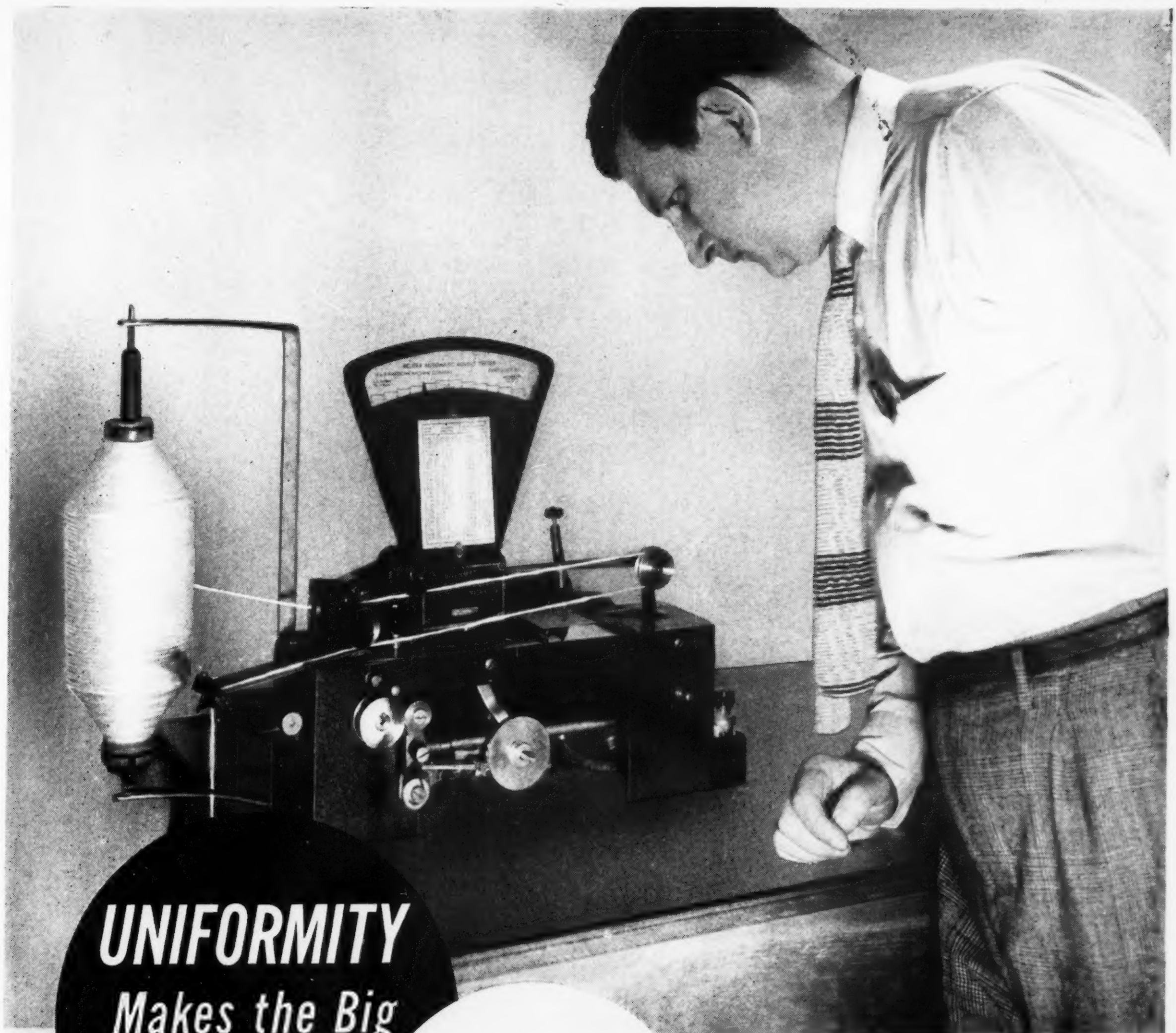

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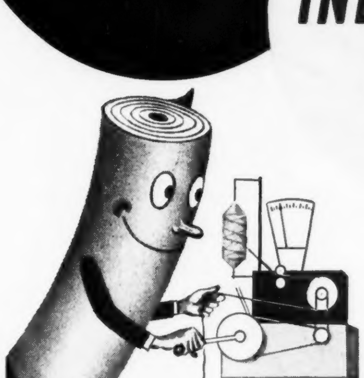
Makes the Big Difference In INDUSTRIAL Fabrics

MT. VERNON FABRICS Give You Greater Fabric Uniformity

Shown is one of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here coefficient of variation and average factors of quality on evenness in roving is being checked with Belger Tester.



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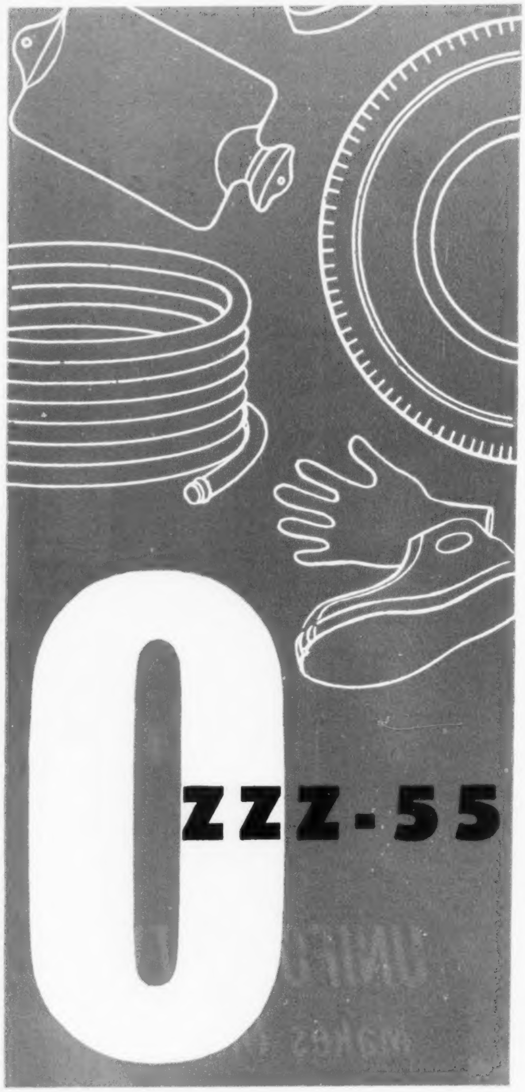
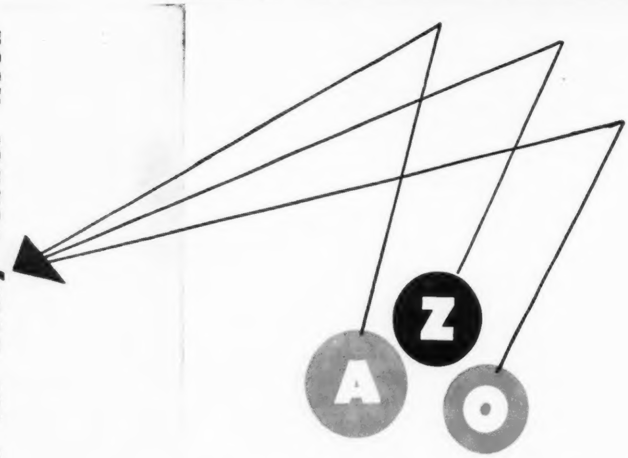
zinc oxide

An easy processing zinc oxide. Uniform particle size and absence of extreme "fines" assures good dispersion in rubber.



AZO
ZZZ-55

zinc oxides for every rubber need



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Here's the new-design tube that gives

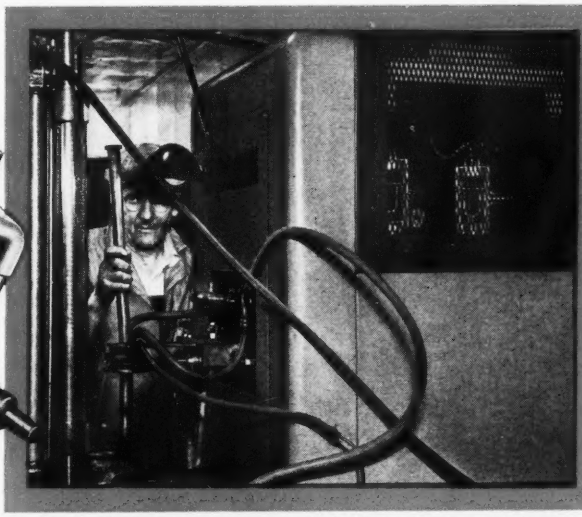
INDUCTION and DIELECTRIC HEATING

"PLUS-ENDURANCE"

For Today's Rugged Production Pace in Metals, Plastics, Wood, Rubber . . .

Federal's F-892

(F-892-R Air-cooled)



Case hardening of tractor shoe pins by Industrial Electronic Engineering Corp., Milwaukee, Wis., using 20 KW Allis-Chalmers induction heating unit equipped with Federal's rugged and reliable F-892 power triode.

OUTSTANDINGLY DEPENDABLE IN MOMENTARY OVERLOADS

SEALING, soldering, brazing, bonding, molding, annealing, drying, pre-heating . . . *whatever* your electronic heating application . . . Federal's re-designed F-892 power triode really keeps production lines rolling . . . *by reducing time-wasting shut-downs for tube replacements!*

Incorporating Federal's new *Double Helical Filament* (which eliminates filament-to-grid shorts) the F-892 has been especially designed to withstand the hard punishment of sudden and extreme load changes . . . to resist mechanical shock and steady vibration . . . to stay on the job *longer* . . . under the toughest conditions.

Back up *your* induction or dielectric heaters with the ruggedness and *plus*-endurance of Federal's F-892. Its proved-design assures you the highest operating efficiency for 10 and 20 KW equipments . . . with *lower* tube costs through *longer* life and *fewer* replacements!

Write today for full information on Federal's F-892 or F-892-R.

"Federal always has made better tubes"

First with the new proved-design

DOUBLE HELICAL FILAMENT

- **Does away with bowing**
- **Eliminates filament-to-grid shorts**
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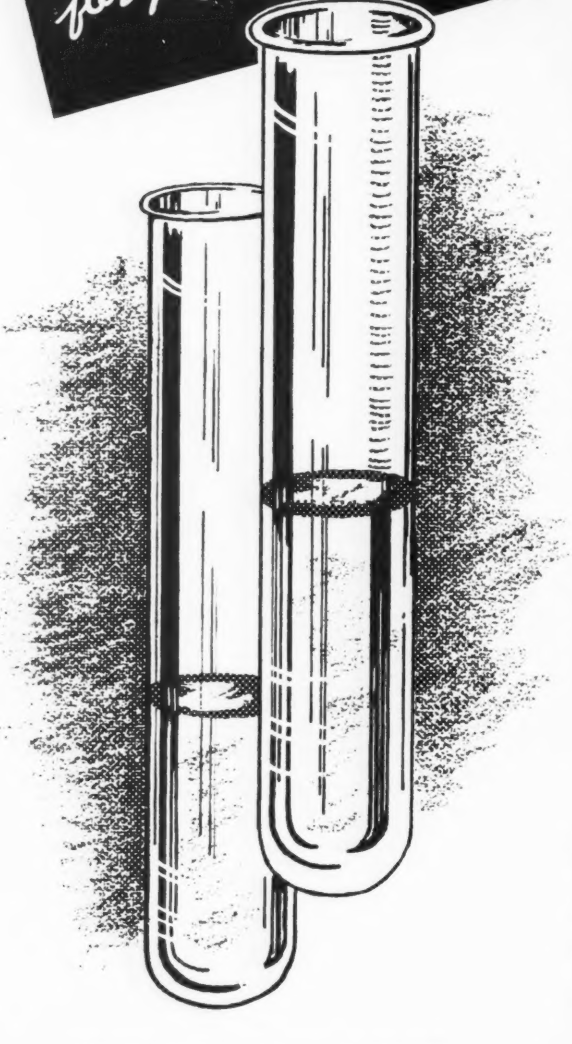
for Rubber Reclaimers



BURCO-RA

A NEW COMPLETE GENERAL PURPOSE RUBBER RECLAIMING AGENT!

BURCO-RA is a complete reclaiming agent for general purpose rubber reclaiming. It was developed expressly to embody in *one material* the characteristics of several, separate ingredients.

BURCO-RA effectively overcomes difficulties encountered with some reclaiming oils — such as objectionable odor, excessive smoking of high volatility components, toxicity and poor physical form.

FEATURES OF BURCO-RA

- Highest quality—ingredients carefully selected and controlled.
- Effective with natural or synthetic rubber—or combinations of natural and GR-S.
- Equally effective with neoprene and acrylonitrile rubbers.
- High yield of uniform reclaims with excellent physical properties and storage stability.
- Readily adaptable to pan, digestor or Banbury—as well as alkali, neutral or acid process.
- Storage problem minimized—single complete agent replaces several formerly required.
- Non-toxic, free-flowing (at room temperatures).

Ask your Burgess representative for technical data, working samples, and prices.

Burgess Pigment COMPANY

EXECUTIVE SALES OFFICES: 64 HAMILTON ST., PATERSON 1, N. J.
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HYDROUS AND ANHYDROUS ALUMINUM SILICATE PIGMENTS, KAOLIN CLAYS, "ANTISUN" SUN CHECKING AGENT, PLASTICIZERS, RECLAIM PROCESSING OILS, GILSONITE COMPOUNDS, CURE ACTIVATORS.

Season's Greetings
SHARPLES
CHEMICALS

Rubber customers bouncing away?

"Alamask" odorants neutralize unpleasant odors . . . help give you rubber products that sell!

More and more people are buying products using foam and sponge rubber—pillows, mattresses, cushions, rugs, shoes. But they're getting something they don't want if they discover the foam or sponge rubber has stored up musty, unpleasant odors.

It's an easy problem to solve, however, for "Alamask" odorants will completely neutralize unwanted off-odors . . . will give your foam and sponge rubber the chance to sell.

Latex manufacturers: Easy-to-use "Alamask" odorants are now available in water dispersible form . . . require no emulsification prior to use.

To find out what "Alamask" odorants can do for you, send for your copy of the booklet "Du Pont 'Alamask' Odorants for the Rubber Industry." Write E. I. du Pont de Nemours & Co. (Inc.), Room 8452 Nemours Bldg., Wilmington 98, Delaware.

District offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.

Du Pont **Alamask** Odorants

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150th Anniversary

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FOR ABSOLUTE UNIFORMITY OF PRODUCT...

in REDS and YELLOWS choose CADMOLITH

COLORS

Soft and Easy to Grind

Insoluble in all Vehicles

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Wide Range of Shades

Opaque

for Rubber Compounding

Glidden leadership in pigment research has produced in Cadmolith* Colors the very finest reds and yellows available anywhere—measured by every standard of importance to manufacturers of all types of rubber products.

Call on Glidden for technical assistance on your color problems.

Send for Folder giving complete details, with color chips. Write The Glidden Company, Chemical and Pigment Company Division, Union Commerce Bldg., Cleveland 14, Ohio.

QUALITY Glidden PRODUCTS

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SUNOLITH* Lithopone	**ZOPAQUE*** Titanium Dioxide	**TITANOLITH*** Titanated Lithopone

*Thiokol** SYNTHETIC RUBBER TYPE FA

The most solvent resistant rubber for paint spray, gasoline and aromatic fuel hose

Thiokol synthetic rubber has long been recognized as the outstanding solvent resistant rubber. This property has led to its wide use in the fabrication of rubber goods that must withstand the deteriorating effects of lacquer and paint thinners and aromatic fuels.

The following formulated compound illustrates a typical formula:

HOSE LINER RECIPE

"Thiokol" FA	100.0
Zinc Oxide	10.0
SRF Black	60.0
Stearic Acid	0.5
B.T.D.S. (1)	0.4
D.P.G.	0.1
NA-22	0.1
Neoprene Type W Masterbatch	29.0

(1) Benzothiazyl Disulfide

Neoprene Type W Masterbatch

"Neoprene" W	100.0
E.L. Cal. Mag.	4.0
S.R.F. Black	55.0
Stearic Acid	0.5
Zinc Oxide	5.0

The Neoprene W masterbatch is added at the end of the mix and thoroughly blended with the base compound.

PHYSICAL PROPERTIES

	Original Properties	Aged 48 hours at 80° F. in SR-6 Fuel (Dried 2 hrs.)	
Cure	40/298°F.	40/298°F.	% Loss
300% Stress	1375	—	—
Tensile	1375	900	34.5
Elongation	300	230	23.0
Durometer	74	—	—

Volume Swell (24 hrs. at 80°F.)	
Distilled Water	4%
Ethyl Acetate	24
Acetone	18
SR-6	20
SR-10	4

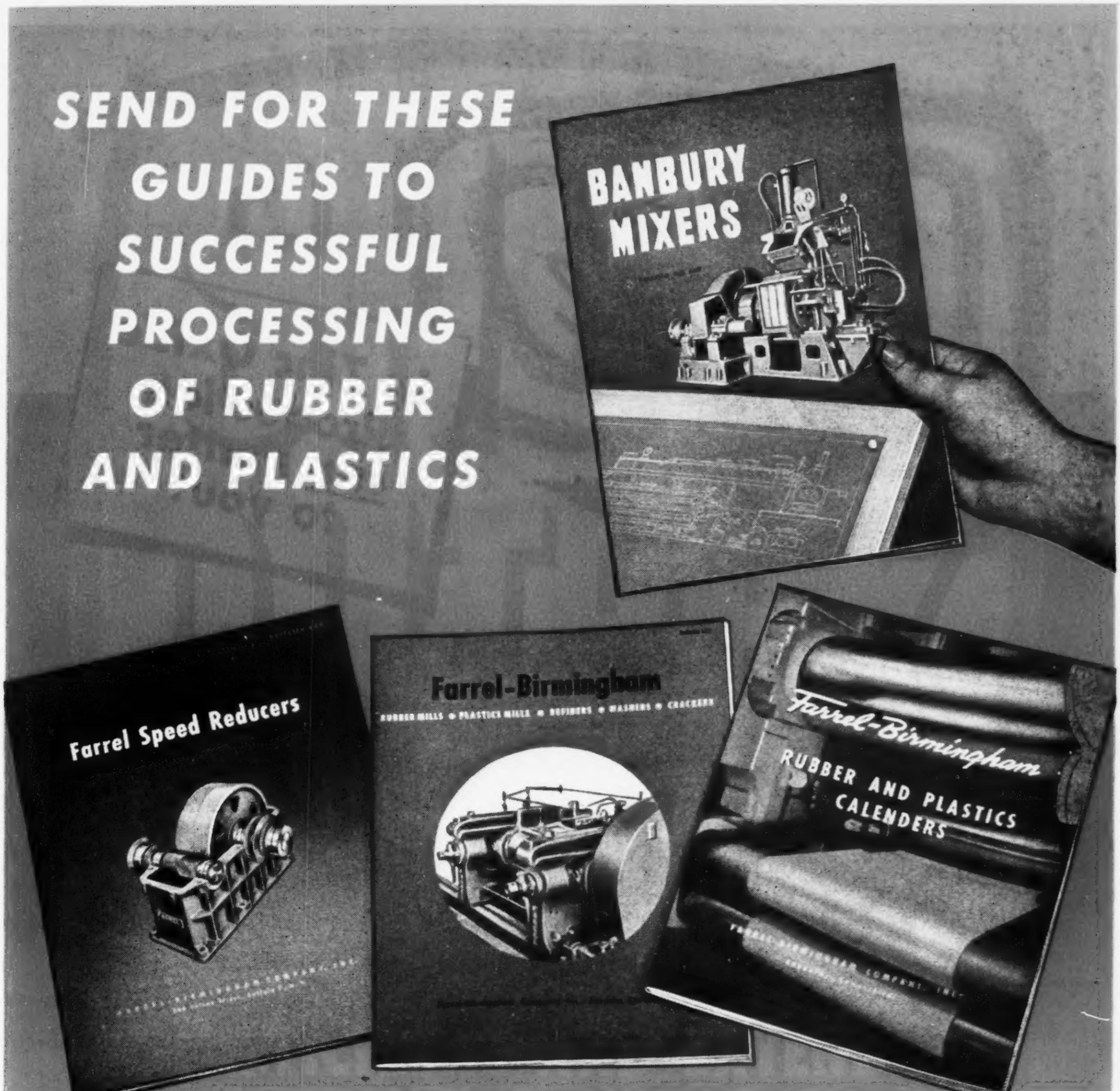
Because of the exceptional solvent resistance of Thiokol type FA, small percentages of synthetic elastomers can be added as processing aids without appreciably reducing its solvent resistance.

For additional technical information and Banbury mixing schedules, write:

This information is believed to be accurate. However, no warranty is expressed or implied regarding the accuracy of these data, or the use of this product.

Thiokol CORPORATION

*Reg. U.S. Pat. Off. 784 North Clinton Avenue, TRENTON 7, NEW JERSEY Ptd. in U.S.A.



If you buy, specify or are in charge of the operation of rubber or plastics processing equipment, you should have copies of these fact-filled bulletins.

In the last few years, Farrel-Birmingham has pioneered many developments in processing methods and equipment, which have resulted in products of greatly improved quality and economies in production.

You will find details of these improvements in the above bulletins describing three of the most important units used in the production of rubber and plastics—Banbury mixers, mills and calenders. The fourth bulletin illustrated gives complete specifications of Farrel speed reducers, which are so widely used with these production machines.

Farrel-Birmingham®

For free copies of any of the bulletins pictured here, just fill out the coupon and mail it today.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia and Derby, Conn., Buffalo, N.Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

FB-756

FARREL-BIRMINGHAM COMPANY, INC. IRW
ANSONIA, CONNECTICUT

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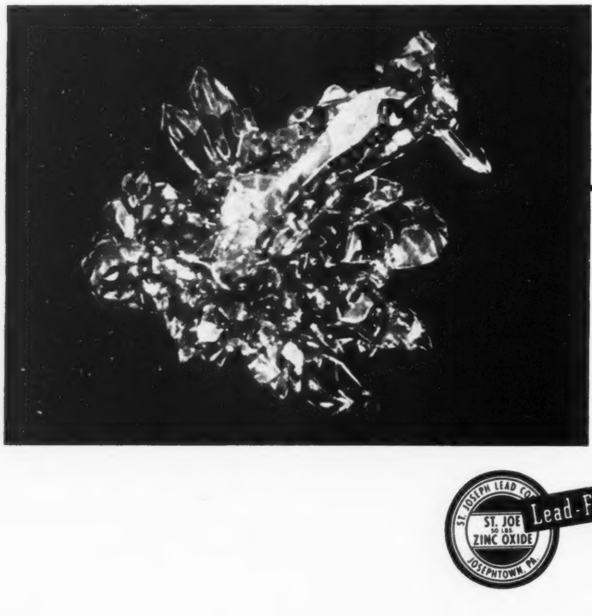
- ☐ No. 189 BANBURY MIXERS
- ☐ No. 174 FARREL-BIRMINGHAM CALENDERS
- ☐ No. 173 FARREL-BIRMINGHAM MILLS
- ☐ No. 449 FARREL SPEED REDUCERS

Name________ Title________
Company________
Address________
City________ State________

THE strange-looking object shown below is a metallurgical monstrosity — a cluster of zinc oxide crystals which was found in the neck of a zinc retort where it had grown in the course of years of abnormal operation of the furnace.

Actual size is about 1/5 of that shown below.



Although zinc oxide is crystalline in nature when viewed under a microscope, it is very rare to encounter the conditions of extreme heat combined with great pressure which were responsible for the uncontrolled growth of a normal ZnO crystal to this size.

St. Joe lead-free Zinc Oxides produced by our patented electrothermic process, are subjected to rigid control during all stages of manufacture — from ore to oxide. Absolute order-to-order uniformity is thus guaranteed to our customers.

Complete physical and chemical properties of St. Joe lead-free Zinc Oxides are described in our new technical manual, ST. JOE ZINC OXIDES. Write for your free copy — on your company letterhead please.

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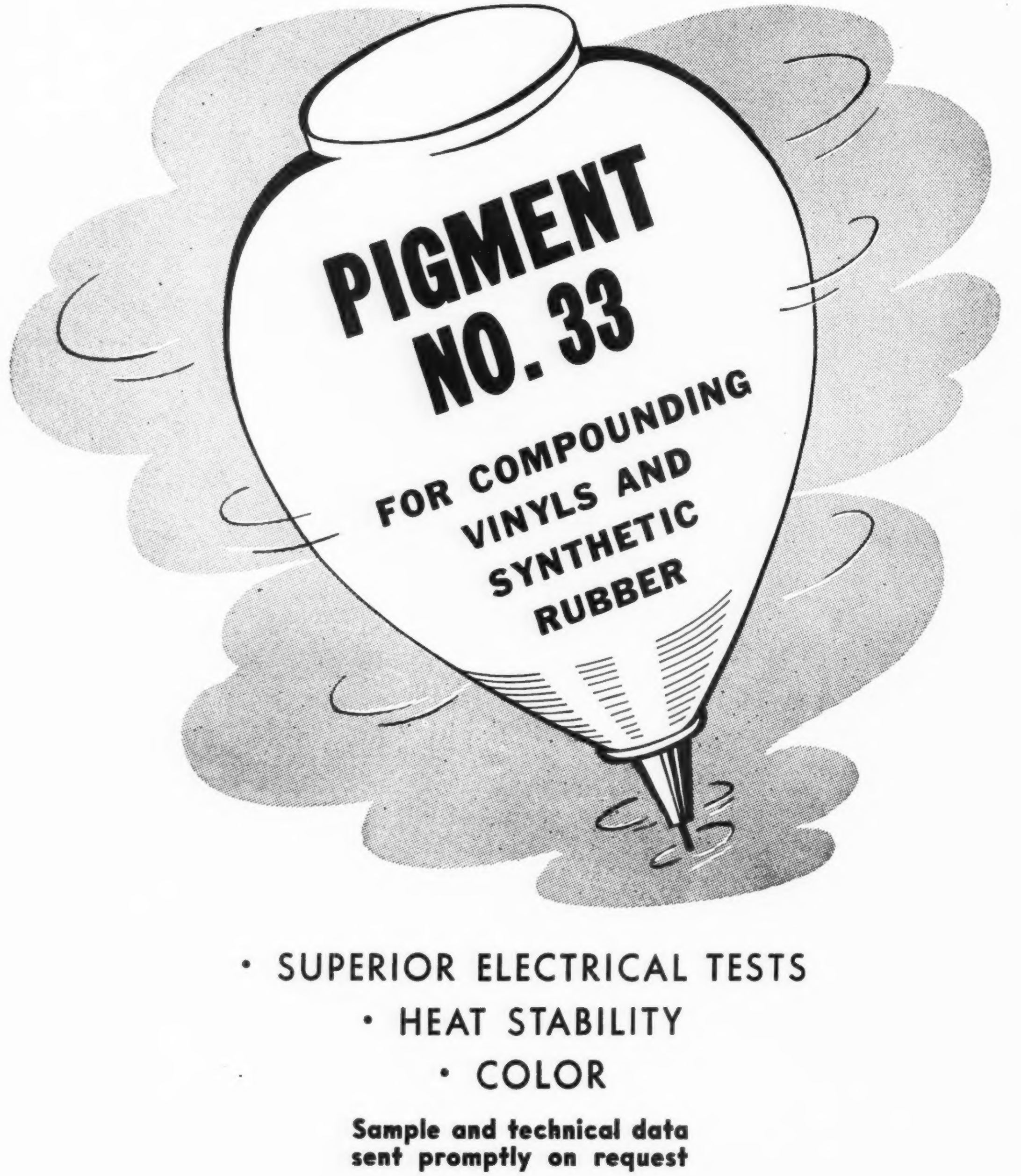
IT'S "TOPS"



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Sample and technical data sent promptly on request

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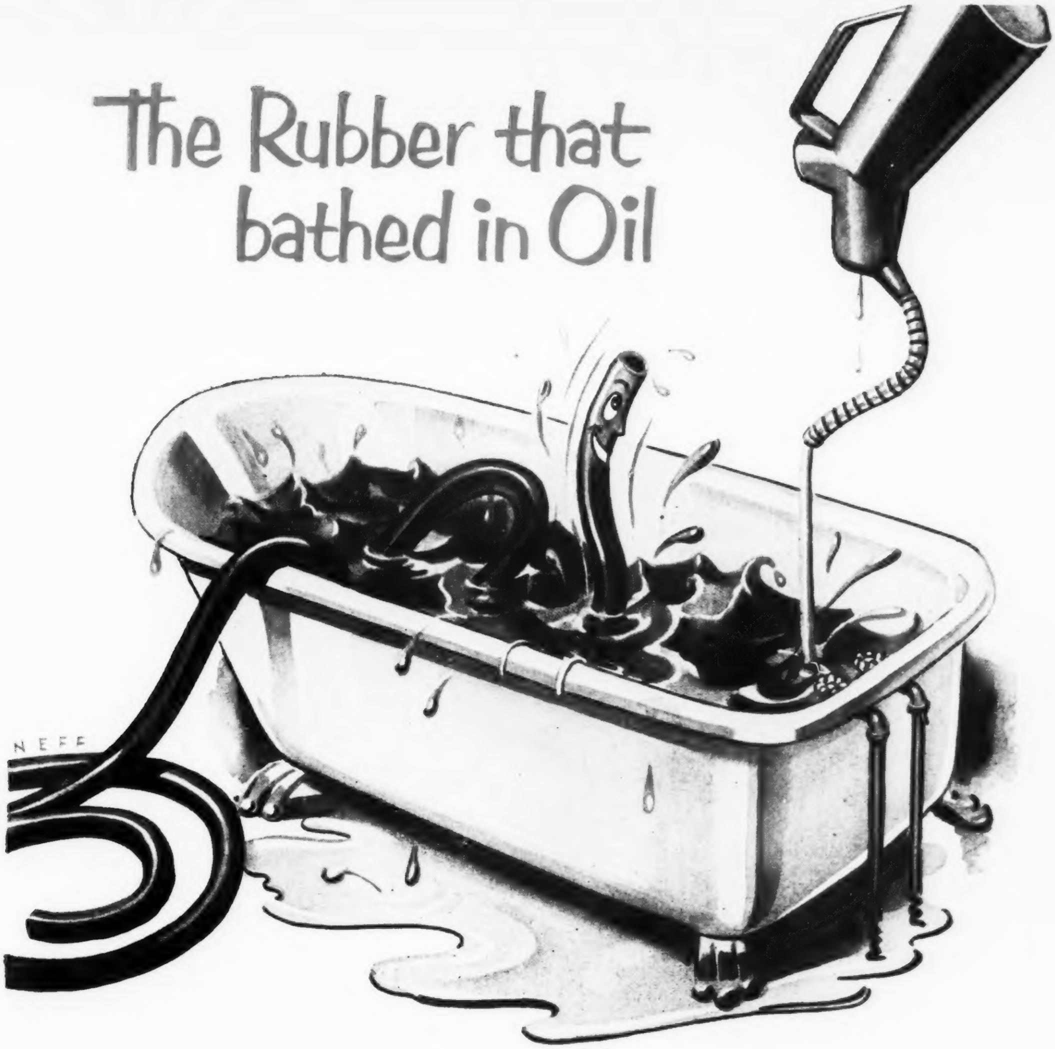
The Rubber that bathed in Oil



and loved it!

Yes, oil and rubber really do mix! That is, if the rubber is **Paracril®**, the special chemical rubber this hose is made of. It really "gets along" with even the most destructive petroleum products!

And tough **Paracril** combines this exceptional oil resistance with—unusual low-temperature flexibility—good heat resistance—high tensile strength—and rubbery resilience.

Paracril is an exceptionally easy processing nitrile type rubber. And it can be combined with other rubbers and many plastics to give them special desirable properties.

Three general grades of **Paracril, A, B,** and C, provide three ranges of oil resistance—moderate, good, and excellent—to meet your particular requirements. Modifications of each general grade are available for special applications.

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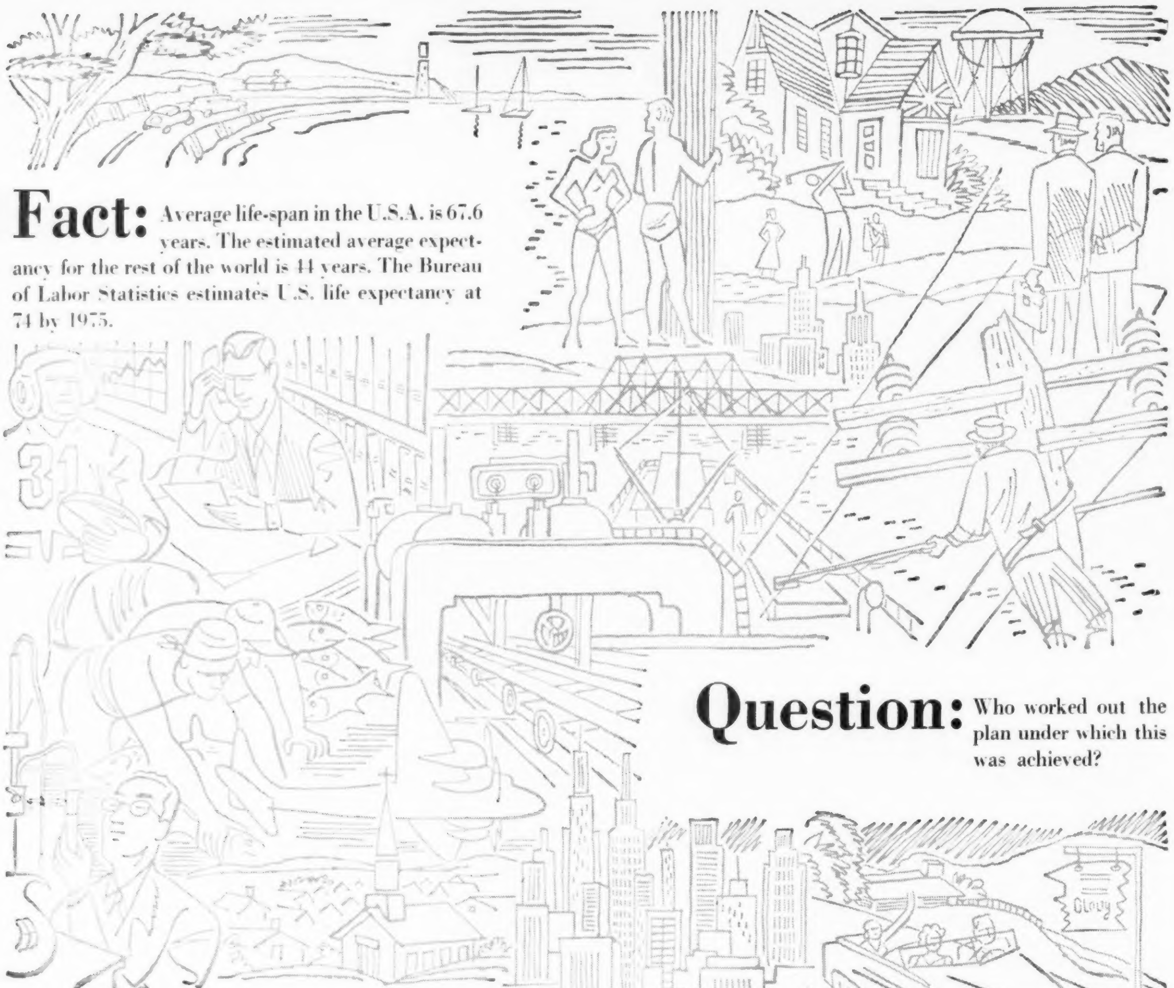

Fact: Average life-span in the U.S.A. is 67.6 years. The estimated average expectancy for the rest of the world is 44 years. The Bureau of Labor Statistics estimates U.S. life expectancy at 74 by 1975.

Question: Who worked out the plan under which this was achieved?

Answer: No one. It is the result of a process, not a plan. It came about largely through the American process of vigorous competition to provide life-saving new medicines, proficient doctors, modern hospitals, better shelter, abundant food supplies and machines that reduce work-effort. The average man-hour of work in 1951 produced 3½ times as much goods as the average man-hour in 1900. Hence, the same process is responsible for more leisure to enjoy longer life. Competition compels wider distribution, increasing productivity and better products, thereby improving and extending our individual lives.

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THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

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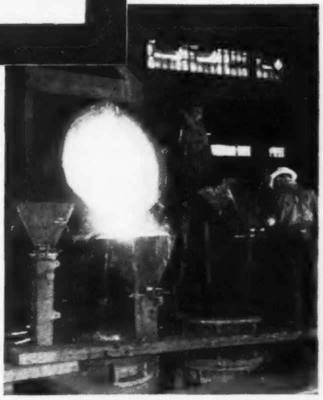
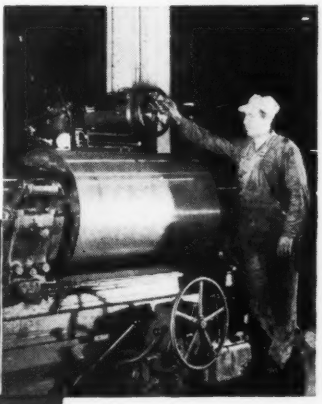
Physical and metallurgical properties of rubber or plastics processing rolls frequently need to be varied to meet special conditions peculiar to the nature of the work to be performed and the requirements of the finished product. That's why the rolls used in Adamson United equipment are custom designed to their specific functions by our own engineers and carefully controlled through every step of manufacture from metallurgical composition to final machining and polishing, in our own roll shops. We have found this precision-minded policy—typical of every phase of Adamson United manufacture—to be our best assurance of customer satisfaction.

Our engineering abilities and plant facilities are available to the industry for the design, construction and installation of all types of rubber or plastics processing equipment.

We invite your correspondence.





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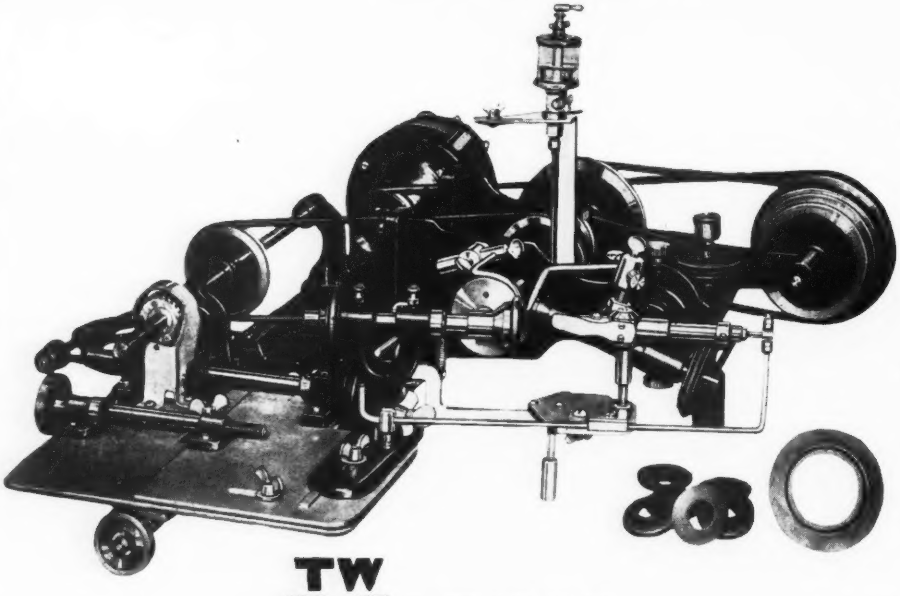

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Prompt delivery on all shearing knives

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Sun Chemical Corp.
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Colors for
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Illustration courtesy of The Murray Corp., Detroit

If you're looking at the bath mat...

then you'll realize that NEVILLE plays an important part in the production of many household items, whether it's a bath-mat, stair-treads, drain-mats, floor-tile or molded electric plugs, as well as enamels, paints or varnishes. In countless every-day products, quality and durability are assured when the manufacturer uses

NEVILLE

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Plants at Neville Island, Pa., and Anaheim, Cal.

C-4

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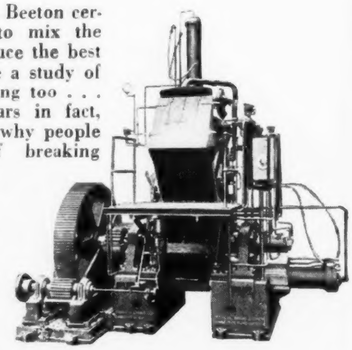

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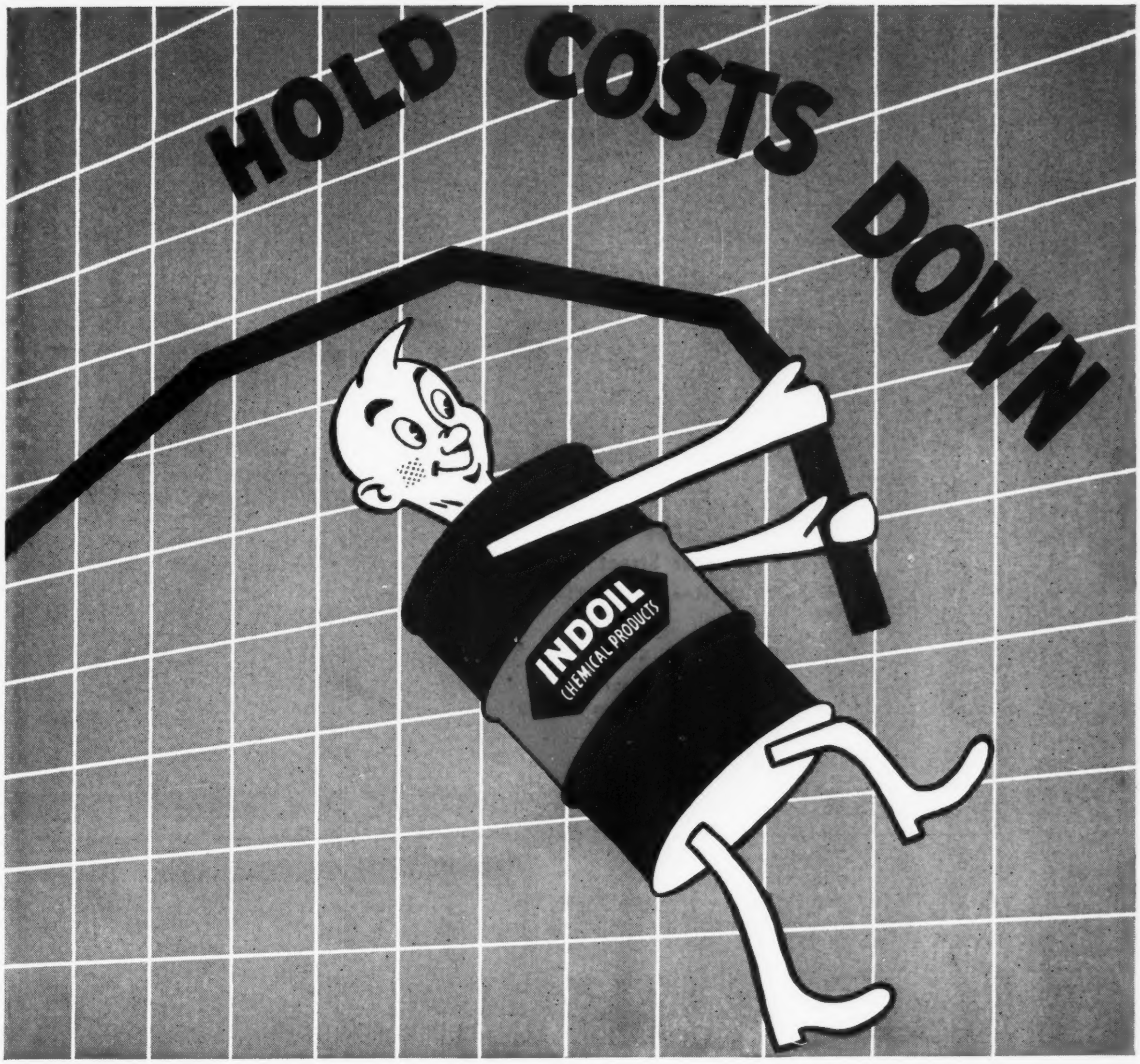

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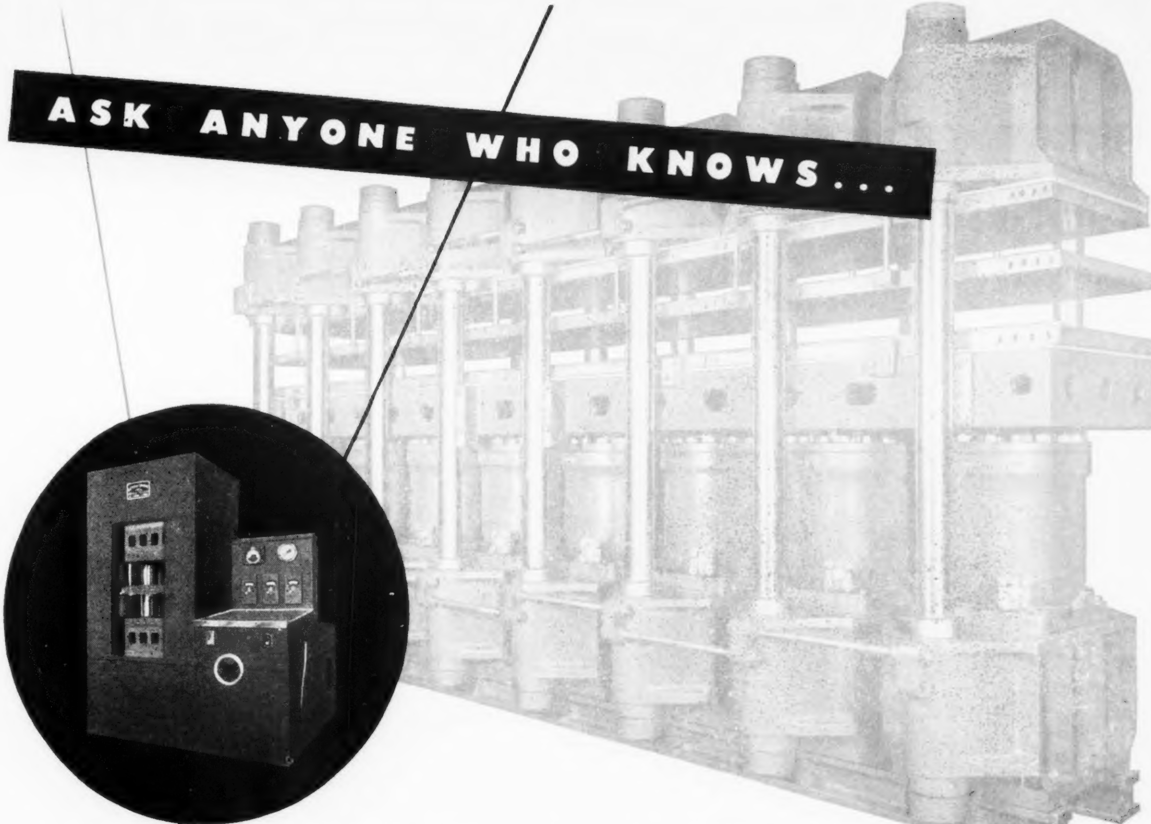

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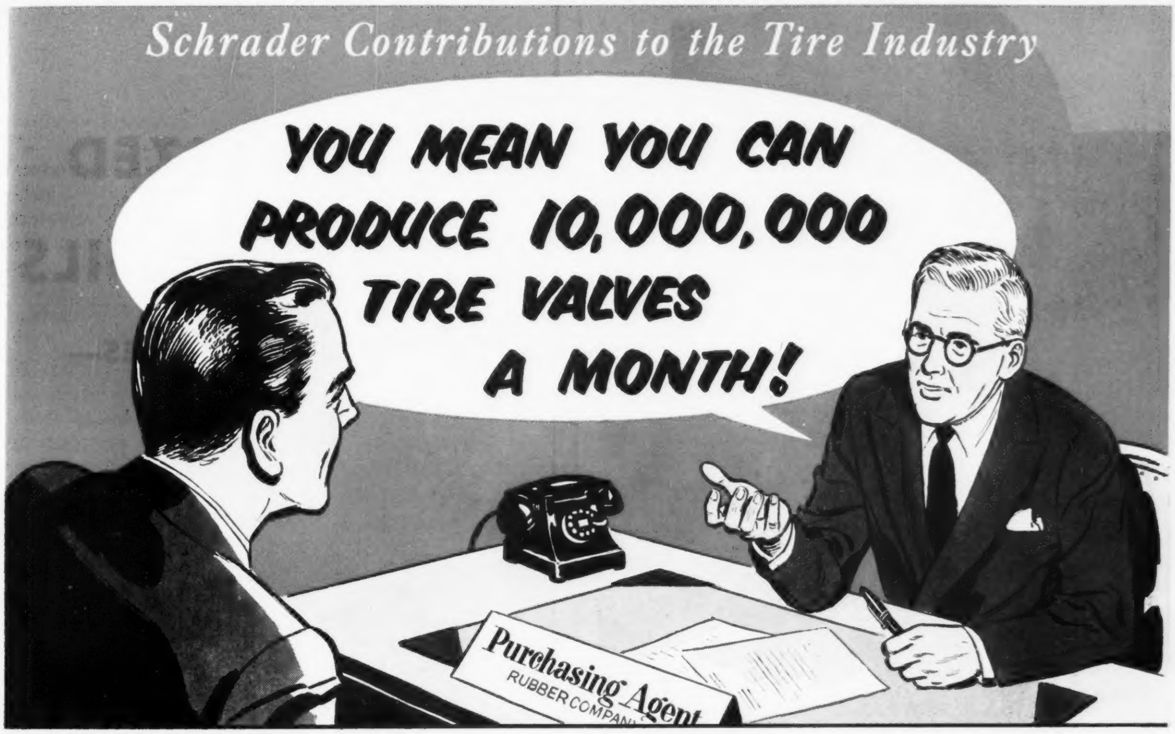

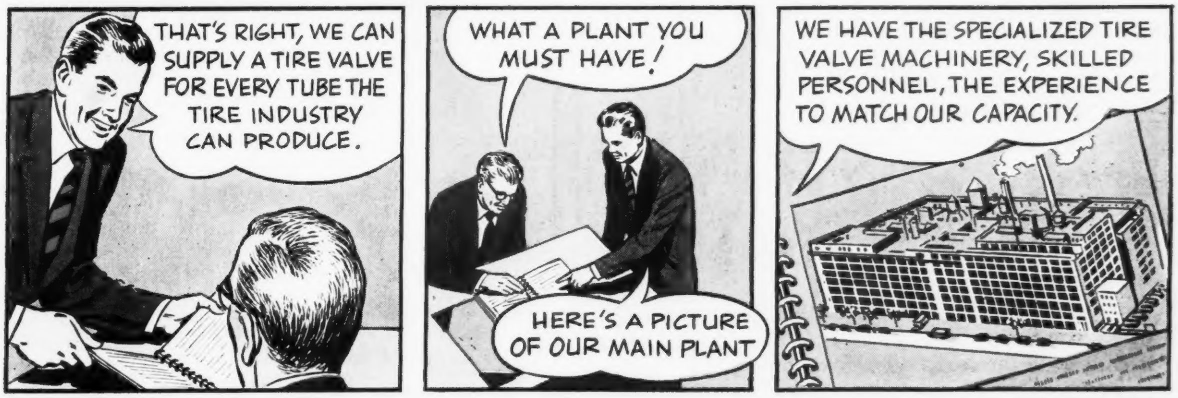

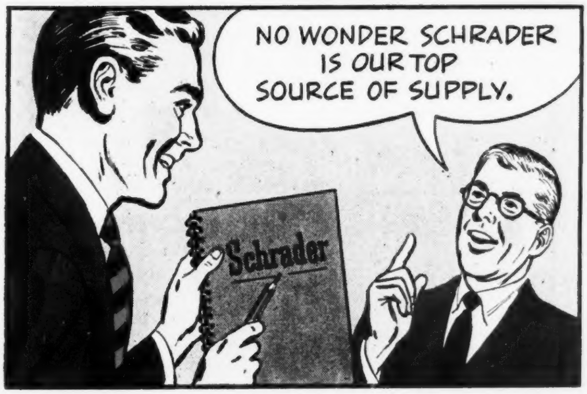

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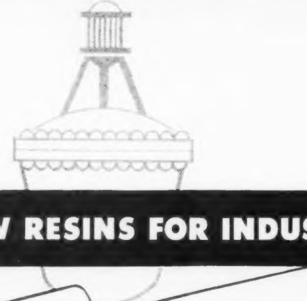

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THE INSTITUTION TODAY is the centre of a great fraternity of rubber manufacturers, scientists, technologists, research establishments, executives and students from every country whose object is the advancement of the cause of the rubber industry throughout the world.

OBJECTS: To promote corporate and concerted effort in the industry by bringing together all those engaged or interested in the various branches of science and technology on which the Industry is based and co-ordinating their respective contributions.

To promote the profession and practice of Rubber Technology.

To encourage the extension of scientific and technical education in the principles and details of rubber manufacture.

To maintain a scheme of Diplomas for the recognition of efficiency in knowledge of all branches of technology essential to the successful maintenance and development of rubber manufacture.

To arrange for the holding of meetings, the reading of papers and the giving of lectures with subsequent discussions and publication.

To foster the systematic study of scientific and technical problems involved in the various phases of the manufacture of natural and synthetic rubbers and rubber-like materials and their conversion into finished products.

To encourage original work and research dealing with the manufacture of rubbers.

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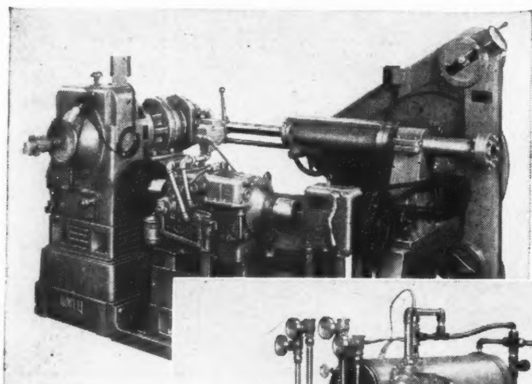

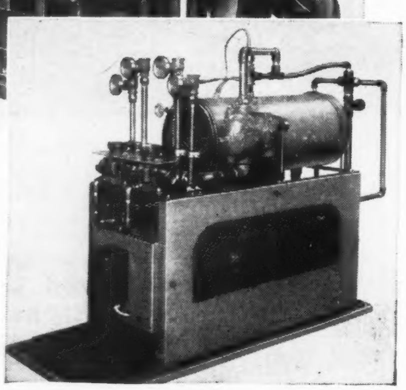

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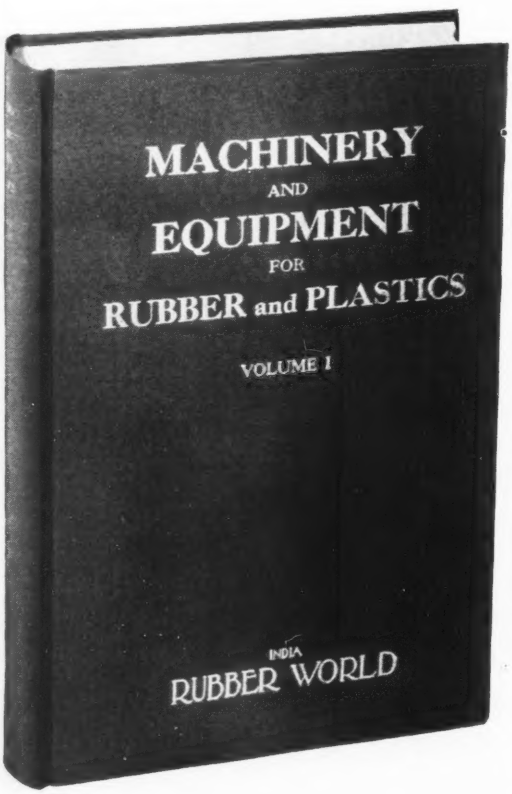

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Table of Contents

Chapter 1. Mills
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Chapter 3. Mixers
Chapter 4. Calenders & Accessories
Chapter 5. Extruders
Chapter 6. Extruder Accessories
Chapter 7. Presses, Compression
Chapter 8. Press Accessories
Chapter 9. Presses, Injection
Chapter 10. Molds & Mold Accessories
Chapter 11. Web Coating & Handling Equipment
Chapter 12. Pressure Vessels
Chapter 13. Heaters, Dryers and Coolers
Chapter 14. Tire & Tube Machinery
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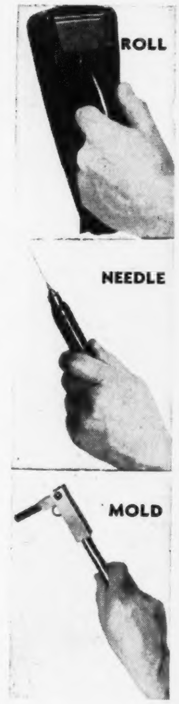

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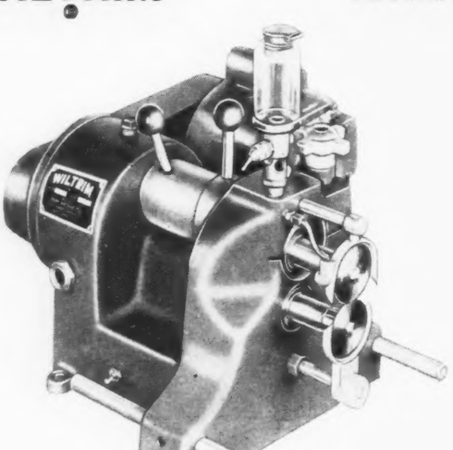

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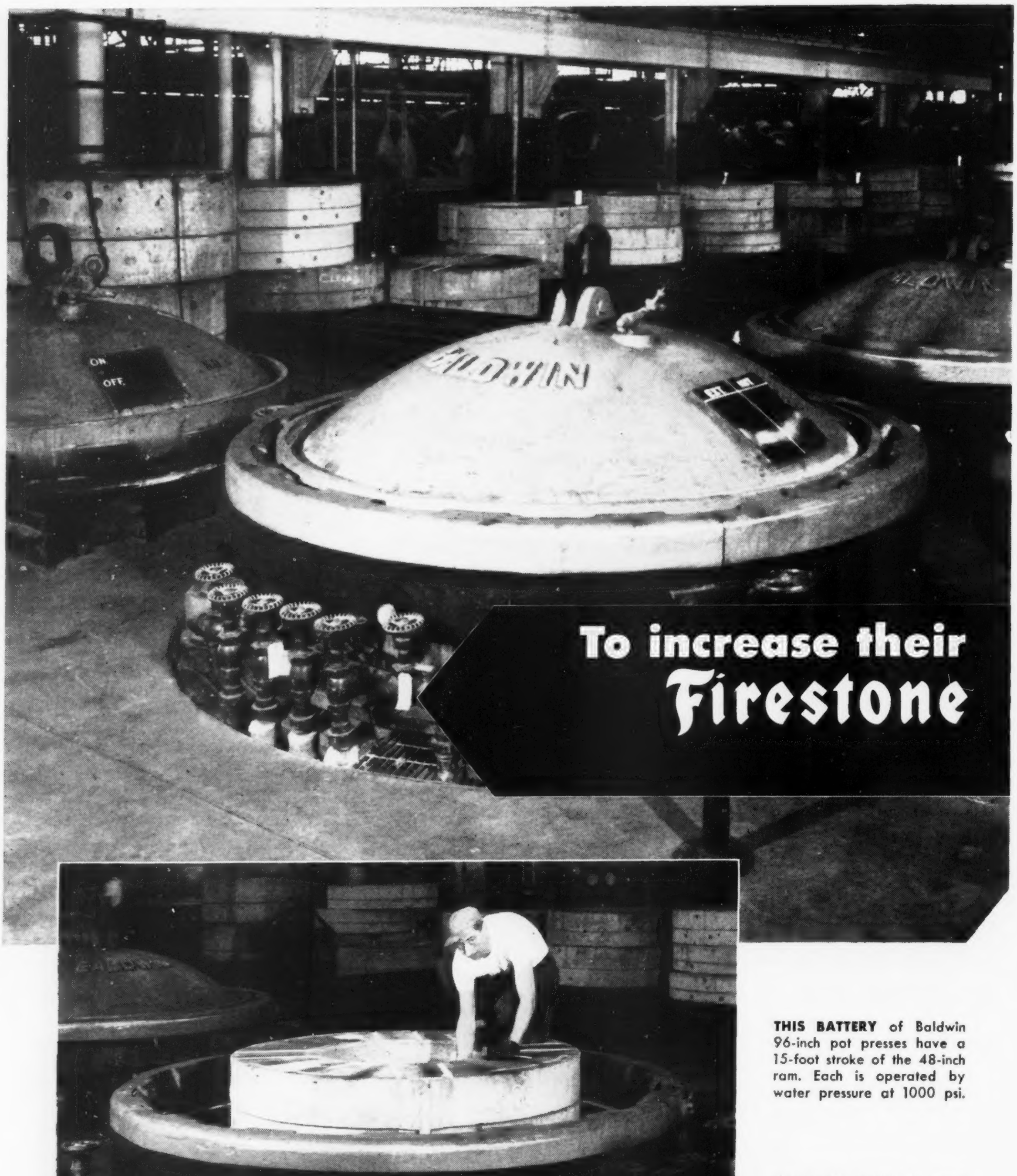

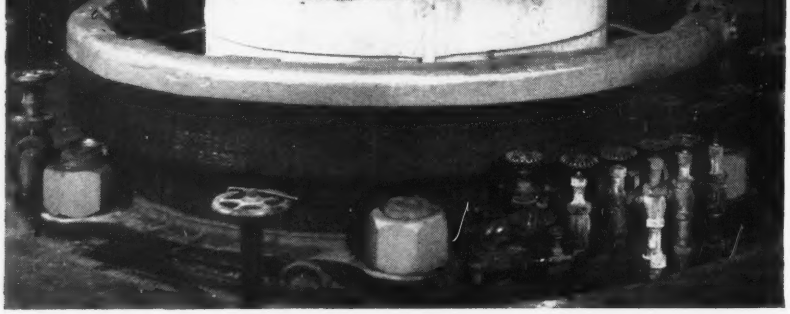

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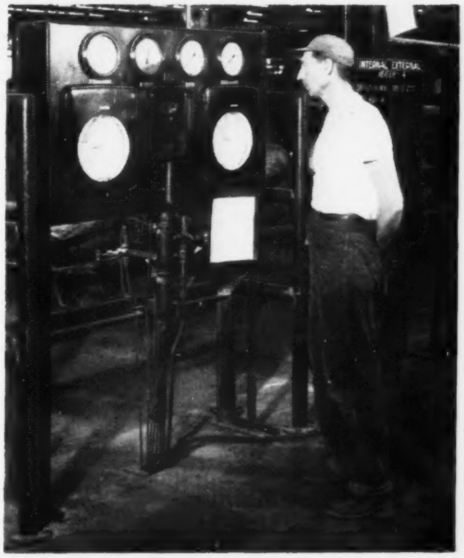

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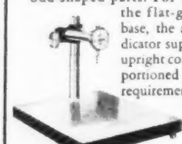

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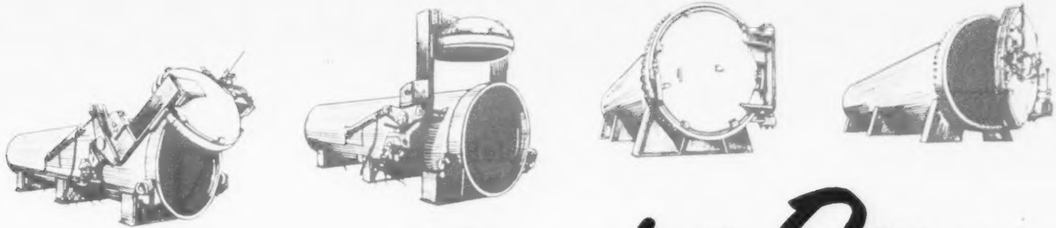

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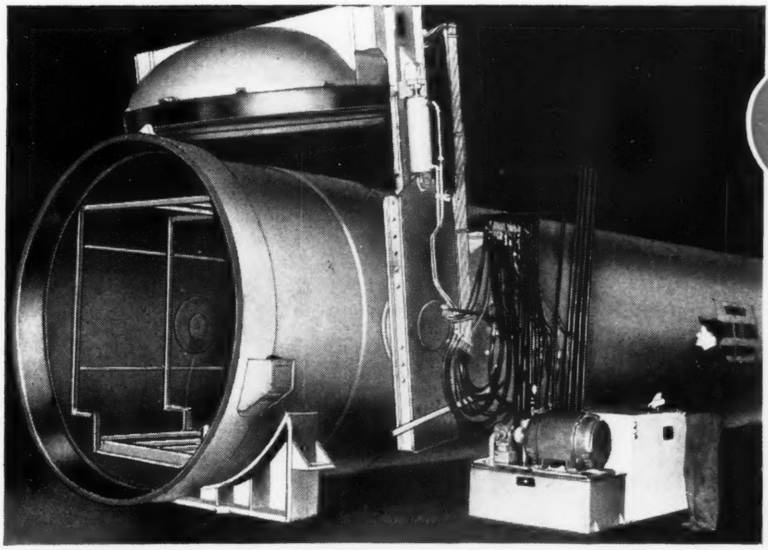

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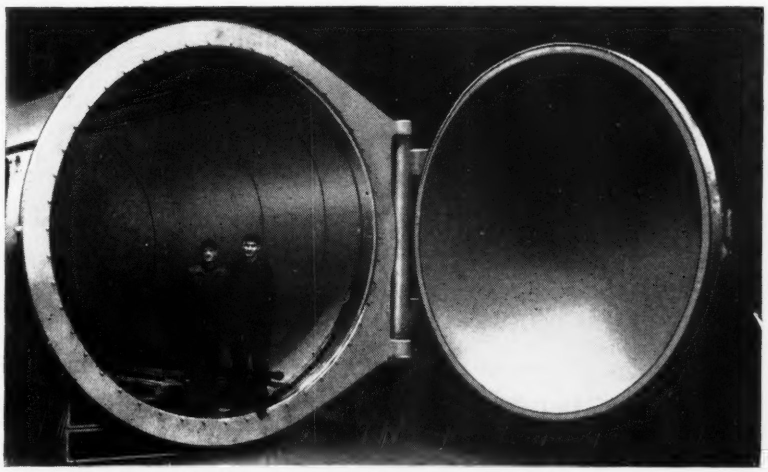

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RUBBER WORLD

A Bill Brothers Publication

DECEMBER, 1952

Vol. 127—No. 3

Table of Contents

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Market Reviews

Statistics

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SUBSCRIPTION PRICES
United States and Mexico, $5.00 per year; Canada, $6.00; all other countries, $7.00. Single copies in the U. S., 50¢; elsewhere, 60¢.

Other Bill Publications are: FOUNTAIN & FAST FOOD, GROCER-GRAPHIC, PREMIUM PRACTICE, RUG PROFITS, Sales Management, TIRES Service Station, YANKEE FOOD MERCHANT.

Copyright December, 1952
Bill Brothers Publishing Corp.

Published Monthly by
BILL BROTHERS PUBLISHING CORPORATION

Editorial and Executive
386 Fourth Ave.,
New York 16, N. Y.
LExington 2-1760.

Office of Publication
Orange, Conn.
Chicago Office: 333 N. Michigan Ave.
STate 2-1266.

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Stress Relaxation in Compression of Rubber and Synthetic Rubber Vulcanizates Immersed in Oil[1]

J. R. Beatty[2] and A. E. Juve[2]

STRESS relaxation in compression in air has been studied for compounds of various polymers. However, rubber seals, gaskets, and other applications are widely used where swelling agents such as oil are encountered. It was thought desirable to measure the stress relaxation properties of various rubbers to determine their performance under such conditions. The results show that continuous stress relaxation is inhibited by the presence of oil, and that unconfined swelling measurements predict the degree of inhibition directly. The variable of temperature and types of oil were investigated.

RUBBER and synthetic rubber-like materials, owing to their elastic properties, are particularly suited for use in gaskets, seals, suspensions, and other uses in essentially compressive strain. The stress resulting from this strain is widely utilized as a seal for fluids or gases. Many of these applications are subject to swelling agents, such as oil, from their surroundings either through design or accident. An earlier report[3] described the stress relaxation properties of seven rubber and synthetic rubber compounds tested in air as a function of the variables of deformation, temperature, sample shape and size, and sample slippage. Swell phenomena have been investigated[4] with rubber compounds in the presence of swelling agents, but in these tests no strain was imposed on the rubber, and the effect of strain, particularly compression, has been reported only to decrease the rate of imbibition of oil.[5]

To investigate the effect of mineral oil swelling agents on rubber compounds four of the stocks were selected from the previous work.[3] These were: (1) a natural rubber stock cured with TMTD; (2) a GR-S stock; (3) a Neoprene GN stock; and (4) a Hycar OR-15 stock cured with TMTD. All were 60 ±5 Shore "A" hardness, loaded with semi-reinforcing furnace black. The continuous stress relaxation of the samples was followed as a function of time, in the presence of three different mineral oils.

Testing Equipment

The tester used was that previously described[3] with only a slight modification. It consists essentially of a method of compressing a sample a predetermined percentage of its original height and measuring the minimum stress necessary to maintain this deflection as a function of time by the adjustable dead weight loading. Figure 1 is a diagram of the tester and the testing jigs used in long-time tests. The modification consisted of the substitution of an oil cup for the bottom platen of the adjustable sample pedestal used for short-time tests. The same jigs used in the preceding work were used exclusively for long-time tests during which they were stored immersed in the oil at the test temperature.

The test samples were ASTM compression set samples 1.129 inches diameter and 0.5-inch height having a loaded area of one square inch. The samples were die cut from six-inch by 10-inch sheets of the cured rubber. Recipes, cures, and stress-strain properties of the compounds tested in this work are given in Table 1. Table 2 lists the properties of the oils[6] used in this investigation, which covers the range of swelling tendency encountered in usual petroleum base oils.

1Presented before the Rubber & Plastics Division, ASME, Chicago, Ill., Sept. 8, 1952.

2B. F. Goodrich Co. Research Center, Brecksville, O.

3J. R. Beatty, A. E. Juve, India RUBBER WORLD, 121, 537 (1950).

4J. R. Scott, *Trans. Inst. Rubber Ind.*, 5, 95 (1929).

A. E. Juve, B. S. Garvey, Jr., *Ind. Eng. Chem.*, 34, 1316 (1942).

5L. Graffe, *Caoutchouc & gutta percha*, 24, 13444 (1927).

6Tentative Methods of Test for Changes in Properties of Rubber and Rubber-Like Materials in Liquids, ASTM D471-51T, "1951 Supplement to Book of Standards, Part 6," p. 147. American Society for Testing Materials, Philadelphia (1951).

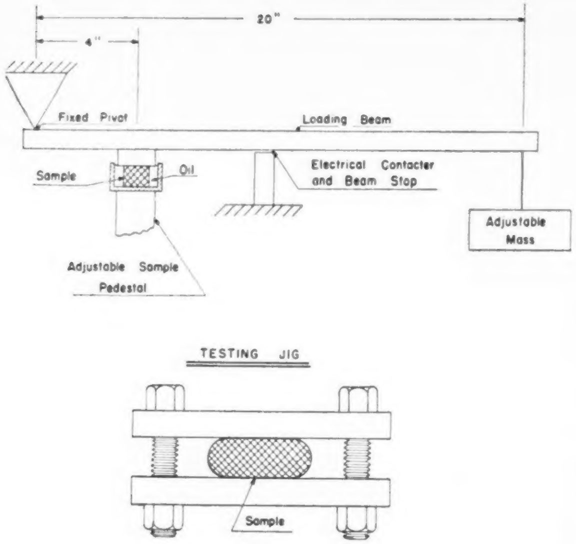

Fig. 1. Diagram of the Tester and Jigs Used for the Stress Relaxation in Compression Tests

Test Procedure

Different procedures were adopted, depending on whether the oil cup or the jigs were used. For the former, samples were conditioned in the oil cups immersed in oil until equilibrium temperature was attained, then deformed the desired amount (30%), and the stress measured as a function of time. The initial stress is obtained approximately from the load deflection curve of a duplicate sample. Time is measured from imposition of load, and the first value of stress recorded is at 36 seconds, or 0.01-hour, which is referred to as the "zero time" in computing the relative stress values for S_t/S_o where S_t is the stress at time t. Stress values were determined in approximately a geometric progression of time intervals since stress relaxation is approximately a logarithmic function of time.

When jigs were used, the sample was conditioned in air, with the sample dipped into oil before being placed between the jig plates in order that slippage between the rubber cylinder and the plates will take place immediately on loading. The test was then conducted in air for about the first 10 hours, after which the sample was removed from the tester with the initial compression maintained, and the sample was immersed into the test oil at the desired temperature. The periodic checks of the stress were made in air also for convenience. It was found that results obtained in this manner agreed with values obtained when the oil cup was used in which the sample was immersed continuously. Figure 2 is a plot of data secured under both conditions of test.

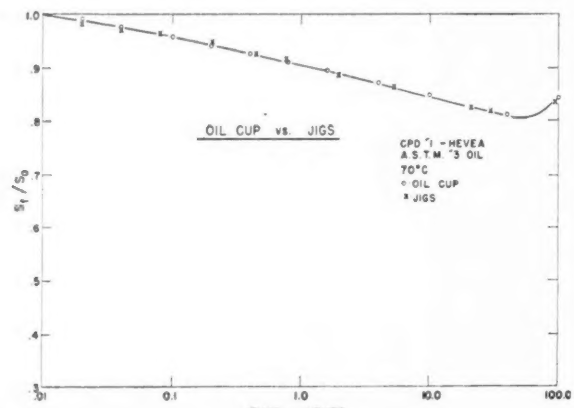

Fig. 2. Comparison of Oil Cup vs. Jigs for Stress Relaxation in Compression Tests in Oils

TABLE 1. RECIPES, CURES, AND TENSILE PROPERTIES OF COMPOUNDS TESTED

Compound 1		Compound 2	
Natural Rubber	100	GR-S-10	100
Zinc oxide	5	Zinc oxide	5
SRF black	80	MBTS†	1.75
AgeRite Powder	1	SRF black	65
TMTD	3.5	Sulfur	1.75
	189.5		173.5
Cured 35 min. at 140° C.		Cured 90 min. at 150° C.	
Compound 3		**Compound 4**	
Neoprene GN	100	Hycar OR-15	100
SRF black	45	Zinc oxide	5
Zinc oxide	5	SRF black	50
Mag. oxide	4	TMTD	4
	154		159
Cured 40 min. at 150° C.		Cured 40 min. at 150° C.	

Physical Properties

Compound	Shore "A" Durometer	Tensile Strength (Psi)	% Elongation	300% Modulus (Psi)
1	61	2800	425	1650
2	64	2400	460	1600
3	66	2700	420	2300
4	63	2600	520	1700

* Tetramethyl thiuram disulfide. † 2-2′ Benzothiazole disulfide.

TABLE 2. TEST OILS[4]

General Description	Low Swelling	Medium Swelling	High Swelling
Aniline point (ASTM D611)	123.9 ± 1° C.	93 ± 3° C.	69 ± 1° C.
Saybolt Universal Viscosity —Sec. (ASTM D88)	98 ± 5	100 ± 5	155 ± 5
Flash point (ASTM D92)	279° C.*	281.6 ± 5.5° C.	201 ± 3° C.

* Minimum.

The accuracy of the measurements using the oil cup container is ±0.5-pound, and as it is rare for the stress to decay below 100 pounds, the maximum error in the determinations is in the order of 1%. With the jigs used in the long-time tests a possible source of error was introduced as the distance between the plates, when the specimen is compressed, is important. Extreme care was used in maintaining the distance constant, and duplicate tests in the oil cup, where the sample was continuously in the testing machine under constant deformation, show no major error results as long as a single operator makes all the measurements using the same technique.

Experimental Results

Effect of Type of Oil

In Figures 3-10 inclusive are the data showing the effect of the three oils at room temperature and 70° C. for the compounds of natural rubber, GR-S, neoprene GN, and Hycar OR-15, whose recipes are in Table 1.

Effect of Polymer

The data for the compounds of the four polymers tested in ASTM No. 3 oil are plotted in Figure 11. Two examples of each class of the easily swollen (natural rubber and GR-S) and swell-resistant rubbers (neoprene GN and Hycar OR-15) are included.

Effect of Temperature

Tests were made at various temperatures. Table 3 gives the results for the four compounds in the low and high swelling oils, ASTM No. 1 and No. 3. Figure 12 shows the accelerating effect of increasing temperatures. It is representative of the effect with other rubbers and oils.

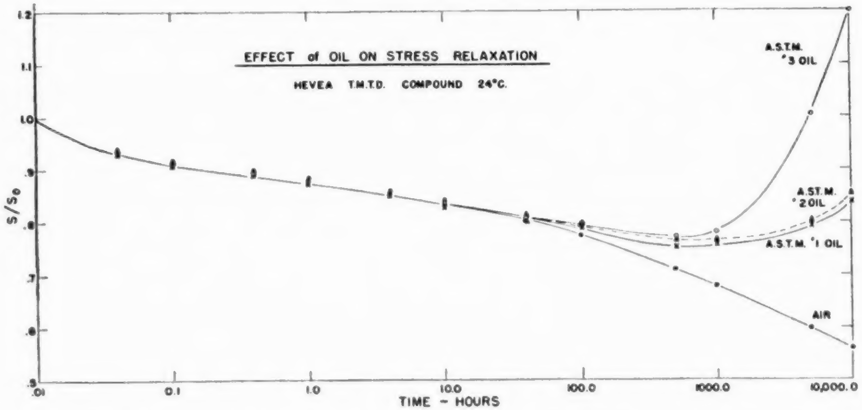

Fig. 3. Effect of Oil on Stress Relaxation: *Hevea* TMTD Compound at 24° C.

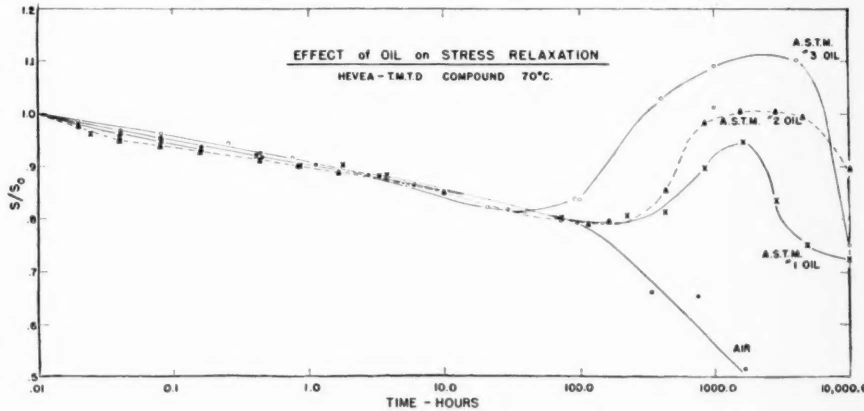

Fig. 4. Effect of Oil on Stress Relaxation: *Hevea* TMTD Compound at 70° C.

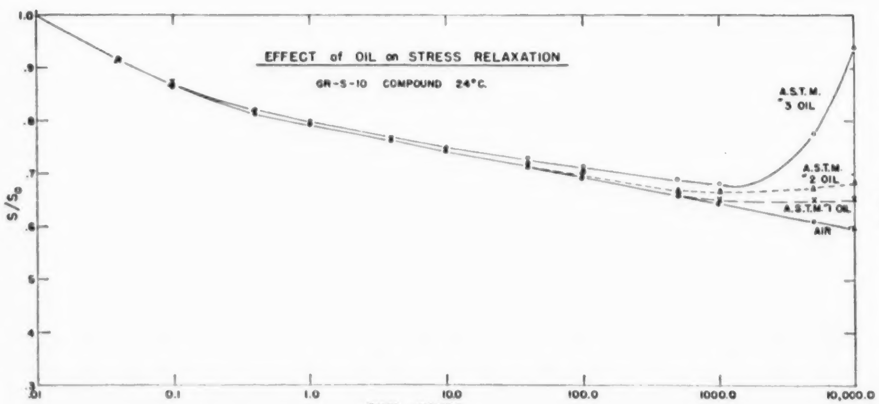

Fig. 5. Effect of Oil on Stress Relaxation: GR-S-10 Compound at 24° C.

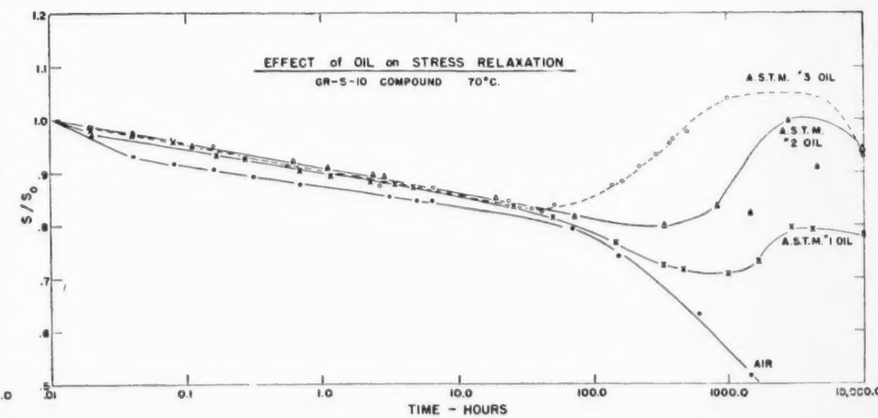

Fig. 6. Effect of Oil on Stress Relaxation: GR-S-10 Compound at 70° C.

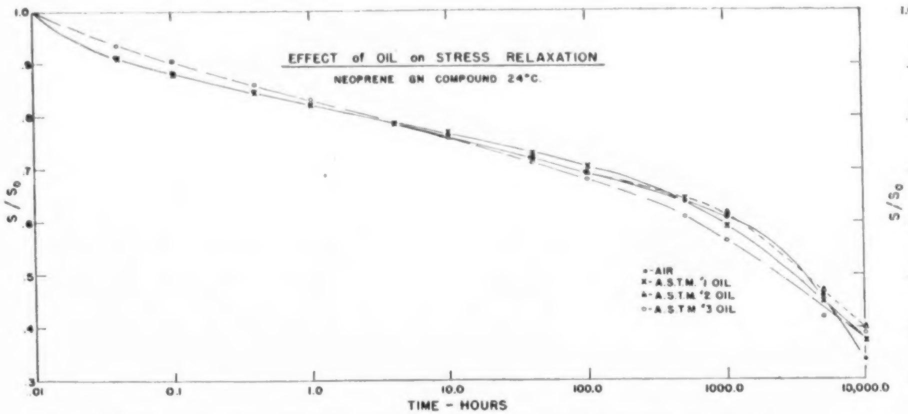

Fig. 7. Effect of Oil on Stress Relaxation: Neoprene GN Compound at 24° C.

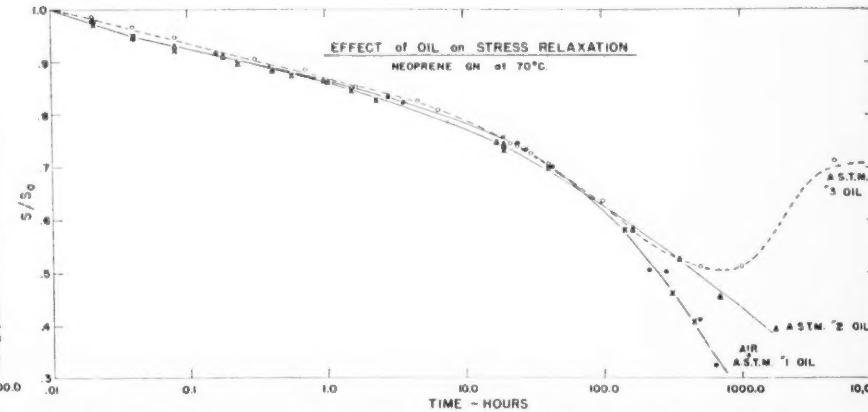

Fig. 8. Effect of Oil on Stress Relaxation: Neoprene GN Compound at 70° C.

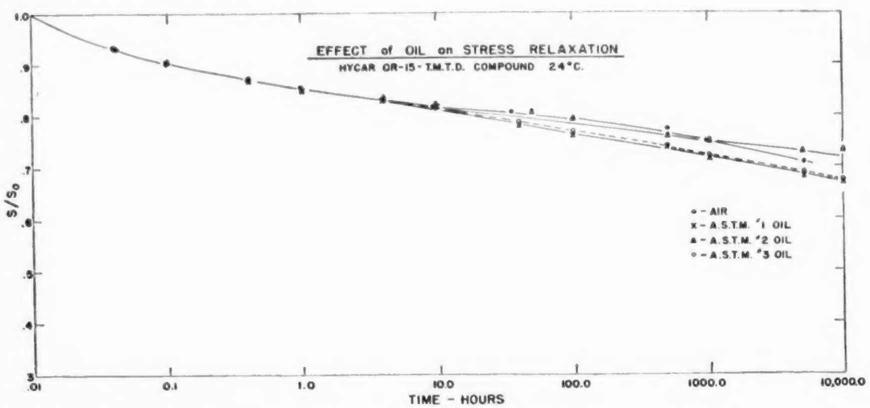

Fig. 9. Effect of Oil on Stress Relaxation: Hycar OR-15 TMTD Compound at 24° C.

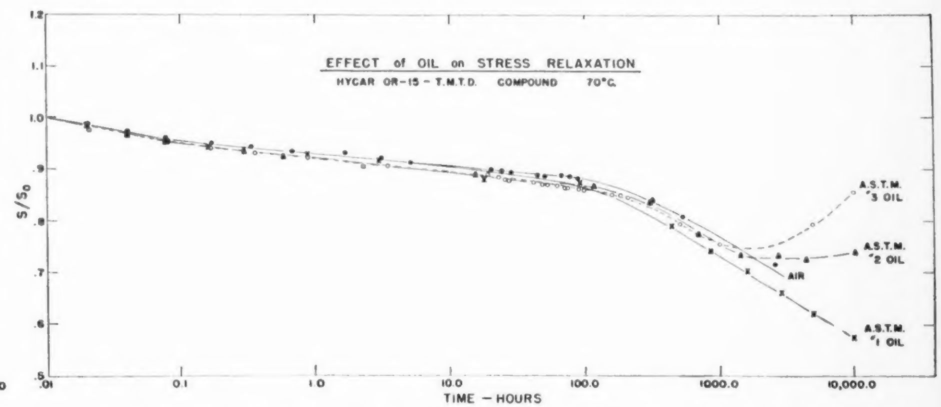

Fig. 10. Effect of Oil on Stress Relaxation: Hycar OR-15 TMTD Compound at 70° C.

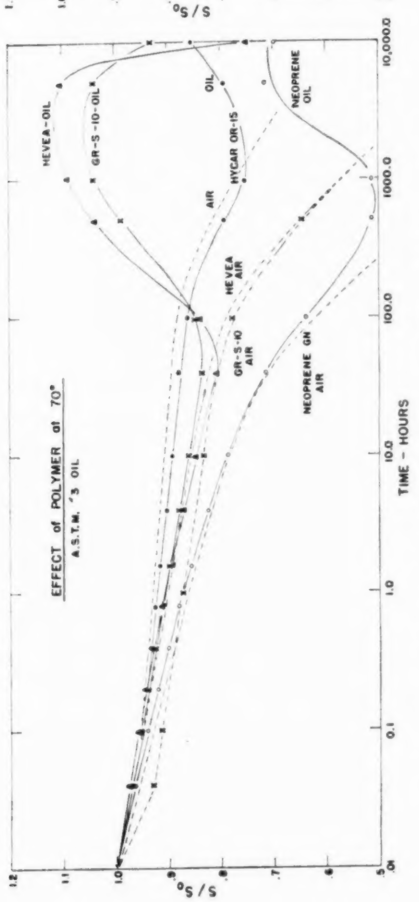

Fig. 11. Effect of Polymer on Stress Relaxation: ASTM #3 Oil at 70° C.

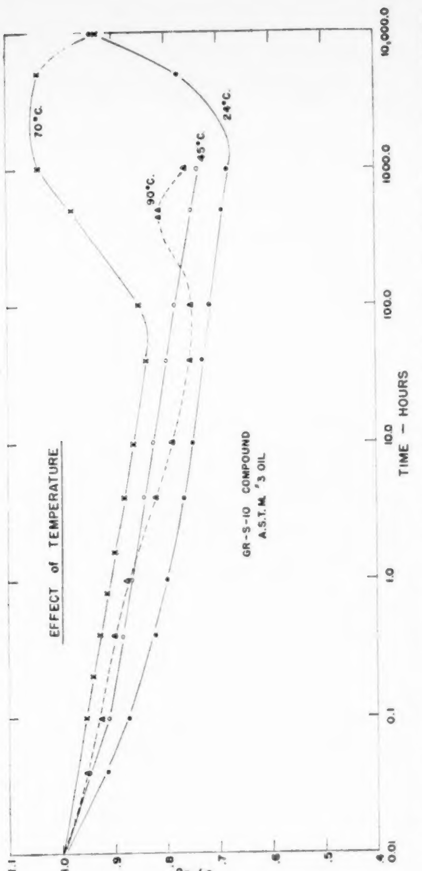

Fig. 12. Effect of Temperature (24, 45, 70, and 90° C.): GR-S-10 Compound—ASTM #3 Oil

TABLE 3. EFFECT OF TEMPERATURE

Time (Hours)	ASTM No. 1 Oil S/S_0 at Temperatures of				ASTM No. 3 Oil S/S_0 at Temperatures of			
	24° C.	45° C.	70° C.	90° C.	24° C.	45° C.	70° C.	90° C.
	Compound 1							
.01	1.000	.....	1.000	1.000	1.000	.....	1.000	1.000
.1	0.910	.....	0.940	0.955	0.910	.....	0.958	0.955
1.	0.878	.....	0.905	0.918	0.878	.....	0.908	0.918
10.	0.838	.....	0.850	0.858	0.838	.....	0.848	0.868
100.	0.794	.....	0.795	0.842	0.795	.....	0.841	0.920
1000.	0.756	.....	0.927	0.900	0.780	.....	1.090	1.022
5000.	0.798	.....	0.750	.....	1.055	.....	1.110	.....
10000.	0.840	.....	0.726	.....	1.200	.....	0.750	.....
	Compound 2							
.01	1.000	.....	1.000	1.000	1.000	1.000	1.000	1.000
.1	0.867	.....	0.940	0.925	0.870	0.910	0.952	0.925
1.	0.792	.....	0.900	0.875	0.800	0.868	0.905	0.875
10.	0.744	.....	0.856	0.790	0.750	0.823	0.860	0.790
100.	0.700	.....	0.785	0.700	0.715	0.780	0.850	0.752
1000.	0.650	.....	0.710	0.700	0.680	0.738	1.040	0.760
5000.	0.647	.....	0.790	.....	0.775	.....	1.040	.....
10000.	0.650	.....	0.780	.....	0.940	.....	0.930	.....
	Compound 3							
.01	1.000	.....	1.000	.....	1.000	1.000	1.000	1.000
.1	0.880	.....	0.917	.....	0.905	0.910	0.940	0.925
1.	0.822	.....	0.855	.....	0.832	0.843	0.860	0.830
10.	0.770	.....	0.790	.....	0.760	0.776	0.788	0.675
100.	0.703	.....	0.610	.....	0.680	0.675	0.637	0.475
1000.	0.590	.....	0.270	.....	0.565	0.450	0.512	0.500
5000.	0.450	.....	0.238	.....	0.420	.....	0.712	.....
10000.	0.375	.....	.....	.....	0.390	.....	0.697	.....
	Compound 4							
.01	1.000	.....	1.000	.....	1.000	1.000	1.000	.....
.1	0.905	.....	0.948	.....	0.905	0.940	0.950	.....
1.	0.850	.....	0.909	.....	0.850	0.900	0.912	.....
10.	0.815	.....	0.895	.....	0.815	0.882	0.892	.....
100.	0.715	.....	0.870	.....	0.770	0.850	0.862	.....
1000.	0.720	.....	0.735	.....	0.725	0.800	0.755	.....
5000.	0.682	.....	0.620	.....	0.690	.....	0.795	.....
10000.	0.672	.....	0.575	.....	0.675	.....	0.855	.....

Correlation of Volume Swell and Stress Increase

Volume swell was determined by ASTM method, D471-51T[6] on the compounds of the four polymers in the three oils at 70° C. for various times up to 1440 hours. Results are shown in Table 4 and Figure 13.

TABLE 4. SWELL OF S.R. COMPOUNDS IN OIL

Volume Increase at 70° C. in %

Time (Hours)	ASTM No. 1	ASTM No. 2	ASTM No. 3
	5RBB 1 (N.R. Tuads Cure)		
24	41	63	123
48	56	85	137
168	73	114	141
336	77	121	149
720	81	129	161
1440	92	139	181
	5RBB 2 (GR-S)		
24	19	35	93
48	23	50	113
168	35	81	121
336	37	98	121
720	39	91	125
1440	38	105	133
	5RBB 3 (Neoprene)		
24	4	12	35
48	5	17	49
168	9	31	70
336	10	39	75
720	31	45	81
1440	11	49	85
	5RBB 4 (Hycar OR-15)		
24	1.4	2	5
48	4	3	6
168	0.7	3	6
336	—7	7	7
720	0.9	2	7
1440	—2	7	6

From the best-fitting smooth curve for each combination of compound and oil the 1440-hour volume swell values were selected and are plotted in Figure 14 as a function of % stress increase relative to the values in air at 1,440 hours for the stress relaxation tests.

Discussion of Results

In many applications the deterioration of physical properties of rubber brought about by contact with oil severely limits their application and/or service life as

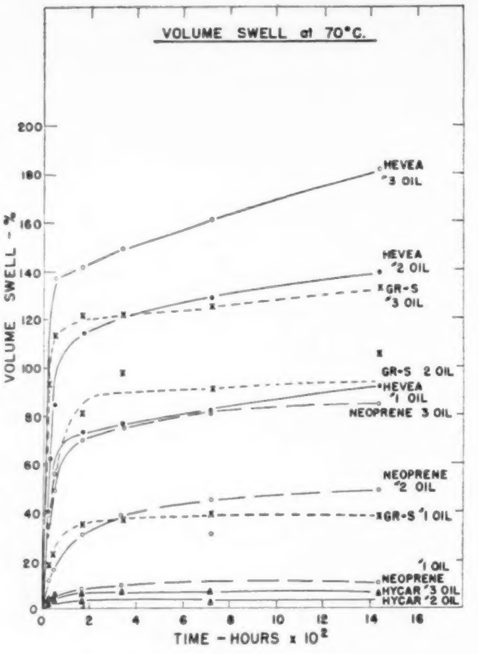

Fig. 13. Volume Swell at 70° C.

swollen rubbers are usually weak in tensile strength and low in modulus. The process by which this deterioration occurs is probably twofold. The solvent action weakens molecular attraction forces in the rubber, while the double bonds are stretched, which may lead to accelerated oxygen attack.[4]

In intermittent stress relaxation tests in which the sample is allowed to swell unconfined between measurements of stress at constant deformation, the stress relaxation is accelerated by the presence of oil.[7] Continuous stress relaxation tests, however, show a different behavior. In some cases, measurements of stress have shown that after 5,000 hours test time the values exceeded the initial stress and were always equal to or greater than the comparable measurements in air. In these tests the data are practically identical for an induction period which varies with the temperature and polymer, regardless of whether oil or air is in contact with the samples. After this induction period the action of the oil becomes apparent as an increase in stress above the values obtained in the presence of air. This increased stress was observed for times up to 10,000 hours.

Effect of Oil

The three oils used in this investigation cover the range of swelling normally encountered in usual petroleum base oils. In Figures 3-6 are shown the data for continuous stress relaxation with the samples immersed in the various oils at 24 and 70° C. of natural rubber and GR-S. Both increase considerably in all three oils, and for comparison purposes results in air for the identical compounds from previous work are included. In every case ASTM No. 1 oil caused the smallest stress increase; ASTM No. 2 was intermediate, and ASTM No. 3 produced the greatest stress increase.

The oil resistant-type rubbers, neoprene and Hycar OR-15, were unaffected by ASTM oils at 24° C., as shown in Figures 7 and 9. They were practically unaffected by No. 1 oil with respect to stress relaxation properties at 70° C.; while ASTM No. 3 oil caused an appreciable increase in stress after considerable time, and No. 2 oil a more moderate trend in this direction, as shown in Figures 8 and 10.

The relatively long time for the onset of stress increase is in agreement with other investigators[5] who found that mechanical stress applied so as to resist the expansion of the rubber reduces the amount of oil absorbed and thus the swell.

[7] B. A. Dogadkin, V. E. Gul, *Doklady Akad. Nauk S.S.S.R.*, 70, 1017 (1950).

Effect of Polymer

Polymers are affected by oil, depending on their molecular constitution. Polar groups or halogen groups contribute to the oil resistance in proportion to the amount present. Natural rubber and butadiene styrene copolymers, such as GR-S, are not noted for their resistance to oils as they are easily swelled in poor swelling agents. Comparative data for compounds of natural rubber, GR-S-10, neoprene GN, and Hycar OR-15 are shown in Figure 11, for ASTM No. 3 oil at 70° C. The rubbers were rated in the following order: Hycar OR-15 showed the least change, neoprene considerably more, and GR-S and natural rubber the most. For comparison purposes comparable curves obtained in air for the same polymer, compound, and temperature conditions are shown as dotted lines. The magnitude of the action of the oil on the rubber is then apparent.

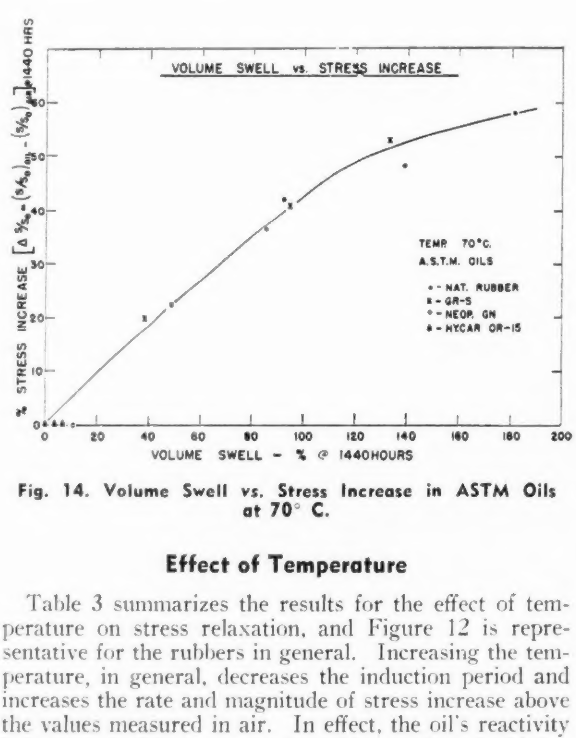

Fig. 14. Volume Swell vs. Stress Increase in ASTM Oils at 70° C.

Effect of Temperature

Table 3 summarizes the results for the effect of temperature on stress relaxation, and Figure 12 is representative for the rubbers in general. Increasing the temperature, in general, decreases the induction period and increases the rate and magnitude of stress increase above the values measured in air. In effect, the oil's reactivity is increased with respect to the rubber, and at the higher temperatures the oil resistant rubbers are affected. This condition is due to increased solubility and decreased molecular attraction between molecules of the rubber.

Correlation of Volume Swell and Stress Relaxation

Neither volume swell nor increase in stress of the stress relaxation tests has reached equilibrium at 1440 hours, but the volume swell curves appear to have reached a somewhat constant slope, so it was assumed that a pseudo-equilibrium had been attained in that the rates were probably of the same order of magnitude at this time. The significance of this correlation of stress

(Continued on page 423)

Effect of Severity of Service on the Relative Abrasion Resistance of Natural Rubber, GR-S-10, and GR-S-100

C. C. Biard[1] and J. F. Svetlik[1]

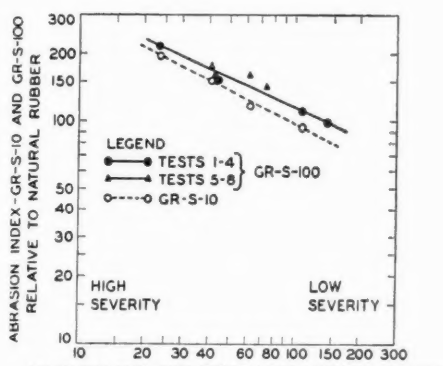

Fig. 1. Effect of Severity on Abrasion Index of GR-S-10 and GR-S-100 — Road Test Data

A LARGE number of test devices has been utilized by the rubber industry to measure the abrasion resistance of rubber compounds. Correlation of laboratory data with service performance is difficult because of the large number of factors which influence abrasion; and during the past 10 years the problem of correlation has become even more acute owing to the wide acceptance of synthetic elastomers.

It is known that the rate at which rubber is abraded, both in the laboratory tests and in service, is determined by the severity of the test conditions. Some of the factors which affect the rate of wear of tires are wheel load, tire position, condition of road surface, atmospheric temperature, mechanical condition of the vehicle, and driver practices. The important factors in a laboratory abrasion test are the load on the specimen, angle of contact, type of abrasive surface, atmoshperic temperature, test specimen temperature.

The influence of different operating conditions has been investigated quite extensively in this laboratory, using the modified Goodyear angle abrader.[2] This work was conducted using tread stocks for which road performance had been determined in order to establish operating conditions which would simulate actual tire wear.

The relative abrasion resistance ratings of different stocks were affected by the severity of the test conditions both in the laboratory and road tests. It is the purpose of this report to show the effect of test severity on the relative ratings of natural rubber, GR-S-10 (122° F. non-pigmented polymer) and GR-S-100 (41° F. non-pigmented polymer) tread compounds.

[1] Phillips Petroleum Co., Bartlesville, Okla.

[2] "Analysis of a Typical Angle Abrasion Machine." W. W. Vogt, *Ind. Eng. Chem.*, Mar., 1928, p. 302.

Scope of Data

The tire test data in this report were obtained from eight different tire tests conducted under both closely and partially controlled conditions. All of the tires for which results are cited were prepared by the same manufacturers and were identical in size (7:00 x 15), tread design, and tread formulations. The tread compounds were natural rubber, GR-S-10, and GR-S-100. The natural rubber stock was a conventional compound containing EPC black; while both of the synthetics were compounded with HAF black.

The tires in the first four tests are identical, and the road tests were conducted at approximately the same time. The tires in the last four tests were made and tested at different times.

The laboratory abrasion tests were conducted on factory mixed tread compounds which were similar to the road tested stocks. The stocks were tested on the modified Goodyear angle abrader at varying degrees of severity. The severity was controlled by varying the wheel angle.

Arrangement of Data

The miles, miles per thousandth inch non-skid tread loss, and abrasion index values for all eight tire tests are shown in Table 1. Laboratory abrasion results determined at 5, 8, 10, 12, 14, 17, and 20 degrees wheel angles for similar tread stocks are presented in Table 2.

Summary

A PART of the synthetic rubber research and development program has been an extensive tire testing program, conducted with the cooperation of the Reconstruction Finance Corp., to determine the relative abrasion resistance of numerous synthetic elastomers in comparison to natural rubber. The various tests have been at considerable variance and have shown synthetic elastomers to vary from slightly poorer to considerably better than natural rubber.

It is shown that the relative rating of synthetic rubber and natural rubber is greatly affected by the severity of road tests. In a series of eight tests conducted under varying conditions, GR-S-100 has exhibited abrasion index values ranging from 98% in a test of low severity to 216% in a very severe test, compared to natural rubber pegged at 100%. GR-S-10 also shows a greater superiority over natural rubber in severe service. Laboratory abrasion data determined on the modified Goodyear angle abrader have shown a similar trend where the test severity was regulated by varying the wheel angle. Correlation of road wear and laboratory abrasion data, therefore, becomes extremely difficult unless the severity of service is established.

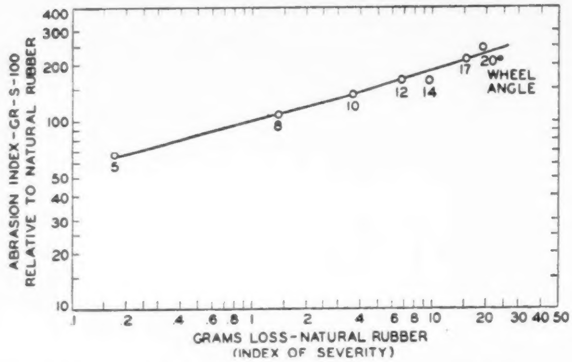

Fig. 2. Effect of Severity on Abrasion Index of GR-S-100 — Laboratory Abrasion Data

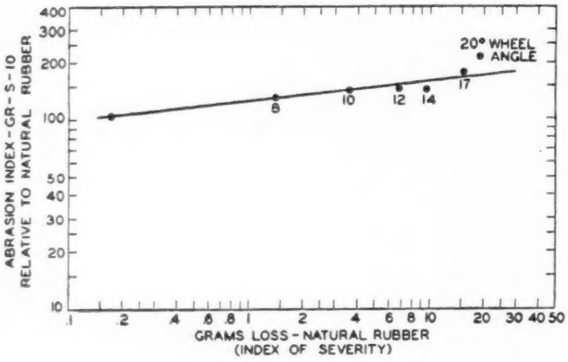

Fig. 3. Effect of Severity on Abrasion Index of GR-S-10 — Laboratory Abrasion Data

TABLE 1. ROAD WEAR ABRASION RESULTS

Rubber	Miles	Miles 0.001" Tread Loss	Abrasion Index %
		Test No. 1	
Natural	8901	23.6	100
GR-S-100	8901	50.9	216
GR-S-10	8901	46.4	197
		Test No. 2	
Natural	17780	43.4	100
GR-S-100	17780	66.1	153
		Test No. 3	
Natural	29900	109.1	100
GR-S-100	29900	120.2	111
GR-S-10	29900	101.7	94
		Test No. 4	
Natural	43130	142.5	100
GR-S-100	43130	140.3	98
		Test No. 5	
Natural	30221	74.2	100
GR-S-100	30221	106.8	144
		Test No. 6	
Natural	13197	43.0	100
GR-S-100	13197	71.1	164
		Test No. 7	
Natural	19980	61.8	100
GR-S-100	19980	99.4	161
GR-S-10	19980	72.4	117
		Test No. 8	
Natural	11812	41.3	100
GR-S-100	11812	74.3	179
GR-S-10	11812	62.3	151

TABLE 2. LABORATORY ABRASION RESULTS

Rubber	Abrasion Wheel Angle, Degrees 5	8	10	12	14	17	20
	Grams Loss						
Natural Rubber	0.17	1.39	3.59	6.73	9.52	15.23	18.85
GR-S-100	0.25	1.27	2.55	4.04	5.76	7.14	7.71
GR-S-10	0.16	1.07	2.52	4.68	6.62	8.57	8.68
	Abrasion Index						
Natural Rubber	100%	100%	100%	100%	100%	100%	100%
GR-S-100	68	109	141	167	165	213	244
GR-S-10	106	130	142	144	144	178	217

TABLE 3. 300% MODULUS OF RUBBERS IN TIRE TESTS 1-4

	Original		Aged 24 Hours at 212° F.	
Minutes Cure at 307° F.	30	45	30	45
Natural Rubber	930	950	1370	1350
GR-S-100	1120	1380	2850	2810
GR-S-10	950	1200	....	2520

In Figure 1 the relative ratings of GR-S-10 and GR-S-100 in road tests, compared to natural rubber pegged at 100% in each test, are shown as a function of the severity. The miles per thousandth inch non-skid tread loss of the natural rubber control in each test has been used as the index of severity; a high value of miles per thousandth inch non-skid loss indicates relatively light service; while a low value indicates very severe service. The relative ratings based on laboratory abrasion results for GR-S-100 and GR-S-10, compared to natural rubber pegged at 100% at each test condition, are shown in Figures 2 and 3, respectively. The weight loss of the natural rubber compound is used as an index of severity; a small loss designates light service; while a large loss designates severe test conditions.

Discussion of Results

The data show that as the severity of both the laboratory and road tests was increased, the relative abrasion resistance ratings of GR-S-10 and GR-S-100 were increased.

Compared to natural rubber pegged at 100% the abrasion index of GR-S-100 increased from 98% in light service to 216% in very severe service. In a similar manner the laboratory abrasion data show that the abrasion rating of GR-S-100 increased from 68% at a five-degree wheel angle to 244% at a 20-degree wheel test angle.

The relative rating of GR-S-10 varied from 94% in light service to 197% in very severe service road tests. A similar relation is seen in the laboratory test data.

Conclusions

The data in this report show that the rate of wear is affected very greatly by the severity of the test. Both laboratory and actual road wear performance data show that synthetic rubber and natural rubber are fairly similar in rate of wear under mild conditions of testing, but in severe service the synthetic polymers are vastly superior to natural rubber. It therefore becomes evident that in order to correlate laboratory data with road test results the severity of service must be known, and a laboratory test conducted under one set of conditions would not necessarily be expected to correlate with all road test results.

Acknowledgment

Portions of this work were conducted under the auspices of Reconstruction Finance Corp., Office of Synthetic Rubber, and its permission to publish this paper is gratefully acknowledged.

"Instrumentation, Tools, and Accessories for Olsen Universal Testing Machines." Bulletin No. 46. Tinius Olsen Testing Machine Co., Willow Grove, Pa. 22 pages. This illustrated bulletin gives complete information on the company's electronic recorders, electronic strain instruments, mechanical extensometers and related instruments, testing and gripping tools, control accessories, electronic load cells, and proving rings for use with its testing machines.

Methods Employed in Compounding Research—II[1]

Ingredients for Compounding Research

I. Drogin[2]

THE compounding research problems which faced the rubber technologists in the past are relatively insignificant when compared with the problems which have arisen in the utilization of the many polymers and compounding ingredients now available. Compounds, according to Geer (4),[3] are much too complex. The listings alone in current rubber technical journals (36) reveal that compounders may now choose from 30 types of natural rubber, 83 butadiene-styrene (GR-S type) polymers, 13 butyl (GR-I type) synthetic rubbers, 35 nitrile type rubbers, 15 neoprenes, 11 "Thiokols," 134 reclaims, a number of special rubbers, various latices of natural, GR-S, nitrile, neoprene, and "Thiokol" rubbers, 185 vulcanization materials, 87 protective materials, 349 processing materials, 120 reinforcing materials, 159 loading materials, 91 coloring materials, 193 miscellaneous materials, 74 solvent materials, 47 surface materials, and 39 reclaim materials.

A systematic classification of the rubbers and compounding ingredients, according to their properties, functions, and applications, is of material aid in approaching compounding research. A general classification of raw materials and compounding ingredients appeared 15 years ago in the chapter on "Practical Compounding" by W. F. Russell in the 1937 A. C. S. monograph, "Chemistry and Technology of Rubber" by C. C. Davis and J. T. Blake. A revision of the classification appeared five years ago in "Compounding Ingredients for Rubber," Second Edition, 1947, compiled by the editors of India RUBBER WORLD. In the revised form the grouping was as follows:

- I. Rubber
- II. Vulcanization Materials
- III. Protective Materials
- IV. Processing Materials
- V. Reinforcing Materials
- VI. Loading Materials
- VII. Coloring Materials
- VIII. Miscellaneous Materials
- IX. Solvent Materials
- X. Surface Materials
- XI. Reclaiming Materials

A breakdown of the aforementioned eleven groups, similar, but not identical to that in "Compounding Ingredients for Rubber," is presented in Table 1. The rubber group comprises natural, GR-S type, butyl, neoprene, nitrile, "Thiokol," special synthetics, and reclaim.

Vulcanization Materials include vulcanizing agents, accelerators of vulcanization, accelerator-activators, and accelerator-retarders. Under Protective Materials are grouped antioxidants or aging retarders, anti-sun materials, copper inhibitors, and chemical stabilizers. Processing Materials comprise plasticizers and softeners, peptizers, processing aids, dispersing agents, tackifiers, flame retarders, and waterproofing agents. Reinforcing Materials include stiffeners and reinforcing fillers. Under Loading Materials appear inert fillers or diluents and factice. Coloring Materials comprise pigments and coloring agents. Under Miscellaneous Materials are incorporated odorants and blowing agents for sponging, bonding agents, antiseptics, anti-gel agents, and marking materials. Surface Materials include dusting agents, finishes, abrasives and mold lubricants; and under Reclaiming Materials are reclaiming oils and other ingredients used in reclaiming natural and synthetic rubbers.

TABLE 1. RUBBER CHEMICALS AND COMPOUNDING INGREDIENTS

- I. Rubber
  - A. Natural
  - B. GR-S
  - C. Butyl
  - D. Neoprene
  - E. Nitrile
  - F. "Thiokol"
  - G. Special Synthetic
  - H. Reclaimed
- II. Vulcanization Materials
  - A. Accelerators
  - B. Activators
  - C. Retarders
  - D. Vulcanizing Agents
- III. Protective Materials
  - A. Antioxidants
  - B. Chemical Stabilizers
  - C. Sun-Checking Agents
- IV. Processing Materials
  - A. Dispersing Agents
  - B. Flame Retardants
  - C. Peptizing Agents
  - D. Plasticizers and Softeners
  - E. Processing Aids
  - F. Tackifiers
- V. Reinforcing Materials
  - A. Reinforcing Agents—Carbon Black
  - B. Reinforcing Agents—Miscellaneous
- VI. Loading Materials
  - A. Extenders
  - B. Inert Fillers
  - C. Rubber Substitutes
- VII. Coloring Materials
  - A. Black
  - B. Blue
  - C. Brown
  - D. Green
  - E. Maroon
  - F. Orange
  - G. Red
  - H. White
  - I. Yellow

[1] Based on a paper presented before the Ontario Rubber Section, C.I.C., Toronto, Ont., Canada, Mar. 11, 1952; The Los Angeles Rubber Group Inc., Los Angeles, Calif., Apr. 1: and the Northern California Rubber Group, San Francisco, Calif., Apr. 10. Part I appeared in our Oct., 1952, issue, p. 65. Owing to circumstances beyond our control, the second installment had to be postponed from the November to this issue.

[2] Director of research, United Carbon Co., Charleston, W. Va.

[3] Numbers in parentheses refer to Bibliography items at the end of this installment. For references (1)-(35) see our Oct., 1952, issue, p. 69.

VIII. Miscellaneous Materials
- A. Anti-Coagulants
- B. Anti-Foaming Agents
- C. Antiseptics and Germicides
- D. Anti-Webbing Agents
- E. Blowing Agents
- F. Bonding Agents
- G. Brake Lining Saturants
- H. Coagulants
- I. Deodorants (Aromatics)
- J. Latex Compounding Ingredients
- K. Mold Cleaners
- L. Synthetic Resins
- M. Wetting Agents

IX. Reclaiming Materials

X. Solvent Materials

XI. Surface Materials
- A. Abrasives
- B. Dusting Agents
- C. Finishes
- D. Lubricants, Rubber
- E. Lubricants, Rubber Surface
- F. Mold Lubricants

Rubbers

Natural Rubber

The marketable grades of crude dry natural plantation rubber are available in nine types comprising (I) Ribbed Smoked Sheets, (II) Thick Pale Crepes, (III) Thin Pale Crepes, (IV) Estate Brown Thick Crepes, (V) Estate Brown Thin Crepes, (VI) Thick Blanket Crepes (Ambers), (VII) Thin Brown Crepes, (VIII) Flat Bark Crepe, and (IX) Pure Smoked Blanket Crepes. These types with subnumbers have been officially established by The Rubber Manufacturers Association, Inc., (RMA)[4] in accordance with its booklet, "Type Descriptions and Packing Specifications for Natural Rubber," effective as of July 1, 1952, and as adopted by the RMA and endorsed by the Rubber Trade Association of New York, Inc. The purpose of the new booklet and specifications is, as explained by RMA in its PA-67 bulletin dated May 14, 1952 (37), to bring up-to-date a 14-year-old document which does not recognize certain advances that have been made in the intervening years. The types cover the full range of grades for which definite standards have been established. All known requirements for dry natural plantation rubber can be satisfied with one or more of these official types. Furthermore new RMA-type samples, recognized as universal standards, have been established for all grades (except standard flat bark crepe). A listing of these grades is presented in Table 2.

TABLE 2. OFFICIAL NATURAL RUBBER TYPE DESCRIPTIONS

Type	Description
I. Ribbed Smoked Sheets	
No. 1X RSS	Superior-quality ribbed smoked sheets
1 RSS	Standard-quality ribbed smoked sheets
2 RSS	Good fair-average quality ribbed smoked sheets
3 RSS	Fair-average quality ribbed smoked sheets
4 RSS	Low fair-average quality ribbed smoked sheets
5 RSS	Inferior fair-average quality ribbed smoked sheets
II. Thick Pale Crepes	
No. 1X	Superior-quality thick pale crepe
1	Standard-quality thick pale crepe
2	Good fair-average quality thick palish crepe
3	Fair-average quality thick off-color palish crepe
III. Thin Pale Crepes	
No. 1X	Superior-quality thin pale crepe
1	Standard-quality thin pale crepe
2	Good fair-average quality thin palish crepe
3	Fair-average quality thin off-color palish crepe
IV. Estate Brown Thick Crepes	
No. 1X	Clean thick light brown crepe
2X	Clean thick brown crepe
3X	Brown to dark-brown thick crepe
V. Estate Brown Thin Crepes	
No. 1X	Clean thin light-brown crepe
2X	Clean thin brown crepe
3X	Brown to dark-brown thin crepe
VI. Thick Blanket Crepes (Ambers)	
No. 2	Clean light-brown thick blanket crepe (Amber)
3	Clean brown thick blanket crepe (Amber)
4	Clean brown to dark-brown thick blanket crepe (Amber)
VII. Thin Brown Crepes	
No. 1	Clean thin superior light-brown crepe
2	Clean thin light-brown crepe
3	Clean thin brown crepe
4	Thin brown to dark-brown specky crepe
VIII. Flat Bark Crepe	
	Standard flat bark crepe
	Hard flat bark crepe
IX. Pure Smoked Blanket Crepes	
	Standard-quality pure clean smoked blanket crepe

An acceptable natural rubber ribbed smoked sheet should be dry, clean, strong, sound, evenly smoked and patterned, and free from blemishes, specks, rust and bubbles, or other foreign matter. A more or less complete list of the procedures covering the examination and classification of natural rubber includes (a) sampling, (b) visual inspection (odor, spotty discoloration, oxidation, identification of foreign material), (c) preparation of sample, (d) Mooney plasticity, (e) test formulation, (f) physical measurements (modulus, tensile, elongation, Mooney scorch), (g) chemical tests (ash, insoluble grit), (h) acetone extract, (i) moisture, (j) softness, (k) rate of cure, and (l) tensile strength. Off-quality rubbers are checked for slow rate of cure; foreign materials, dirt, sand, wood splinters; soft tacky, wet, or dead rubber; and color, particularly applied to crepe rubber.

Figures to show the actual consumption of natural rubber in the United States by grades are not available; however, special reports on the analysis of natural rubber imports by grades for the years 1948, 1949, and 1950 were prepared by the RMA and the Rubber Trade Association of New York for use of the United States delegation to the International Rubber Study Group meetings of those three years. In addition, an analysis of imports for the year 1951 was made by the General Services Administration when this agency was the exclusive buyer and distributor of natural rubber in the U. S. A.

TABLE 3. NATURAL RUBBER REQUIREMENTS BY GRADE

	Analysis of Imports by Grade Group*			Industry Stated Purchase Requirements—First Half, 1951	GSA‡ Imports, 1951
	1948 %	1949 %	1950 %	%	%
Group 1 1 RSS	23.38	28.25	20.93	10.15	17.85
Group 2 2, 3, 4, and 5 RSS	42.83	35.25	33.93	43.22	37.05
Total Groups 1 and 2	66.21	63.50	54.86	53.37	54.90
Group 3 1X & 1 Thin Pale Crepe Thick Pale Crepe	1.79	2.77	2.63	2.74	1.24
Group 4 2 & 3 Thin Pale Crepe Thick Pale Crepe	1.89	2.05	2.51	1.54	0.85
Group 5 Thin and Thick Estate Browns Thin Brown Crepes	7.35	9.02	12.64	16.80	10.81
Group 6 Thick Blanket Crepes (Ambers) Smoked Blankets	19.24	18.10	21.74	19.72	24.67
Group 7 Flat Bark and Other	3.52	4.56	5.63	5.83	4.75

* RMA-RTA special report—calculated from data covering 73.6% imports in 1948; 65.8% in 1949; 74.5% in 1950.

† RMA report to GSA 2/2/51 based upon questionnaire S-1662 of 1/3/51.

‡ GSA analysis of 498,543 L. T. dry natural rubber (sent to industry with Bulletin PA-67, 5/16/52).

4 444 Madison Ave., New York 22, N. Y.; 1822 M. St. N.W., Washington 6, D. C.

All of this information is given in Table 3. Of particular note is the fact that between 53 and 66%, approximately, of the rubber imported was #1 through #5 RSS. The next most popular group was that including Thick Blanket Crepes and Smoked Blankets, which ranged between 18 and 25% of the rubber imported. Thin and Thick Estate Browns and Thin Brown Crepes accounted for from 7% to 17%.

As indicated in the footnote for Table 3, the data covered between 66 and 75% of the imports for the years 1948, 1949, and 1950, and was based on 498,543 long tons of rubber imported by the GSA in 1951.

Technically Classified (TC) Natural Rubber

RMA-type descriptions are termed inadequate for completely evaluating the various grades and types of natural rubber. Existing marketing methods, based on visual inspection of the rubber, are no guide to the technical properties of the material. This point has been amply demonstrated by Newton, Philpott, Fairfield-Smith, and Wren (38) who showed that Malayan rubber from a number of estates conformed to the RMA visual standard for RSS-1, but the average technical properties of the sheet differed in a highly significant manner. The variability lies between the produce of different estates or between output on different days from packing houses or remilling plants.

The need of high standards of natural rubber was emphasized by the Crude Rubber Committee of the RMA at the ninth meeting of the International Rubber Study Group in Ottawa (39) where it was pointed out that 41.6% of 498,543 long tons U. S. Government purchased natural rubber was below the grade contracted for, 11.0% was one grade or more below contract grade, which is usually considered in the non-bona fide category. As pointed out by McColm (40), insofar as present knowledge goes, it is impossible to produce a completely uniform smoked sheet. Therefore technical specifications, as developed, will be used as a supplement to the RMA-type classifications for some time to come.

The most successful method proposed for marketing natural rubber on the basis of uniform technical characteristics is that submitted by the French delegation to the Sixth (London, 1949) meeting of the International Rubber Study Group (41). It proposed that, as a provisional scheme, the existing variability in the natural product should be classified by two characteristics, the processability, as measured by the Mooney viscosity, and the vulcanizing characteristics, as measured by the modulus test after vulcanizing under standard conditions. Each characteristic could be divided into three divisions, and each could be superimposed on the other, thereby giving rise to a structure of nine possible technical classes.

The processability of the rubber was to be indicated by the shape of the mark; a line would represent rubber with a low Mooney viscosity and, therefore, easy to process; a circle would indicate rubber with medium processing properties; while a cross would designate rubber with a high Mooney viscosity. The mark could be applied in one of three colors. Red would indicate low modulus, slow vulcanizing rubber; yellow would designate rubber with medium vulcanizing characteristics; while blue would represent high modulus fast vulcanizing rubber.

The French proposal, which was immediately put into practice in Indo-China, was thoroughly examined at a meeting organized in September, 1949, in Kuala Lumpur by the Rubber Research Institute of Malaya; later in May, 1950, at Brussels and in August, 1950, in Singapore. The French system of classification of rubber met with considerable interest and soon was recommended for trial by rubber growers from all parts of the Far East (42). Finally in September, 1950, in Akron, at the third meeting of Technical Committee 45 of the International Standardization Organization, representatives of the rubber producing countries reached tentative agreement with the users in respect of the test methods to be used.

Technically classified rubber (TC Rubber) is a term suggested by Dr. van der Bie, director of the Indonesian Rubber Research Institute (INIRO). The rubbers are those for which the normal market classification is supplemented by additional information, obtained from tests carried out on the freshly prepared rubber. The rubber so classified is identified by special marks on the bales. It is sold solely on the basis of its RMA grading; the technical class marks are added as extra information for the benefit of the consumer.

Technically classified rubber, as pointed out by Le Bras (43), is just ordinary rubber as it is actually prepared. Nothing is changed: neither the appearance, nor the price, but, as a result of marks on the bales, the consumer is immediately aware of two fundamental characteristics of the rubber: its viscosity and vulcanization characteristics. The viscosity is expressed in degrees Mooney, and the vulcanization characteristics by the modulus. The natural rubber is offered at the same price as that current for the RMA grade and is ordered in the ordinary way through trade channels; the basis of sale is the RMA grade. As pointed out in News Sheet No. 2 of the International Rubber Research Board (44), the fundamental intention is to place on the market rubbers which are more uniform in technical properties, thus giving improved service to consumers.

Commercial quantities of technically classified rubber are now being marketed by the French producers in Indo-China and Malaya. Low Mooney rubbers, with values less than 73, are indicated by a colored line on the side of the bale; rubbers with Mooney values between 73 and 87, by a circle; while those with Mooney values larger than 87, by a cross. The vulcanization characteristics are determined by mixing the rubber to the A. C. S. No. 1 formula,[5] curing for 40 minutes at 127° C. (260.6° F.), measuring the modulus at 600% elongation of a dumbbell (Schopper ring tests have been made at 660% elongation since January 1, 1951, so that they will be on a comparable basis with dumbbell test strip tests made in this country at 600%), and are indicated by the color of the mark.

Rubbers with a modulus less than 427 psi. (30 kg./cm^2) are indicated by a red mark; those with a modulus between 427-711 psi. inclusive (30-50 kg./cm^2) by a yellow mark; while those with moduli more than 711 pounds psi. (50 kg./cm^2) bear a blue mark. The combination of three marks and three colors gives nine identifiable classes.

At present (45) Malaya is producing technically classified rubber at the rate of 15,000 tons a year, and a further 5,000 tons a year is coming from Indo-China. The output is increasing rapidly, and it is likely that some 25,000 tons will have been produced during 1952; for the time being it is available in only three grades, RSS-1X, RSS-1, and RSS-2. The producers are well aware of the importance of extending the scheme to all other grades which can be produced in a sufficiently consistent manner to permit the TC marks to be used on the bales (46). According to Newton (47), some 16,000 tons of TC rubber were tested in 1951, but only 8,853 tons were

[5] Rubber	100.0
Stearic acid	0.5
Zinc oxide	6.0
Sulfur	3.5
Mercaptobenzothiazole	0.5

actually marked and shipped, some 550 tons coming to the United States, it was said. Between 25,000 and 30,000 tons will be prepared in 1952. Practical steps were taken to extend the TC scheme to smallholders rubber, and several substantial deliveries of TC-RSS-3 have already been taken by large tire manufacturing companies.

Consignments of rubber are generally made up of bales from different sources, but all bales bearing the same mark and therefore having properties (when first prepared) falling in the range quoted above will differ from each other to a smaller extent than bales taken at random from the consignment.

It is not, however, intended that the technical-class mark should form part of the basis of sale. The rubber will be marketed on the basis of the present RMA specifications so that the consumer will not be inconvenienced in his purchasing. The technical-class mark is intended only as additional information to give to the consignment greater value to the user by indicating bales which, when taken together, form a lot possessing substantially uniform properties.

By virtue of the additional technical information on the bales, blending of several different consignments of the same market grade should no longer be necessary, but that the grouping together of Technically Classified rubber bearing any one class mark would be an adequate means of assuring uniformity. Other advantages to be obtained from the use of TC rubber were the reduction in the amount of control testing necessary on incoming lots and the possibility of meeting the demand for rubber of certain technical specifications in larger or smaller amounts when necessary.

The properties of rubber change during storage. In particular the rubber hardens appreciably during shipment to, and storage in, temperate regions. Thus tests made on the rubber in a temperate country will not give the same results as the original tests made on the freshly prepared material (44). The hardening can be quite marked (46). The Mooney value of freshly prepared rubber, be it sheet or crepe, shows a marked increase during the first few months' storage (48). The average Mooney value of RSS-1, when freshly produced, is about 75; whereas the average figure for RSS-1 which has been stored in the U. K. for a few months is about 95. The reasons for this hardening are not yet fully understood; but it seems to be, at least in part, concerned with the final stages of drying out the rubber. According to studies at the Institut Français du Caoutchouc in Paris, there is some evidence that there would be an advantage in measuring the Mooney after a light mastication of the rubber and that a valid classification of the rubber might be based on such a test (49).

It has been found that the modulus increases somewhat (10-20%) during storage in temperate regions (49). Therefore consumers cannot necessarily expect to obtain exactly the same test results as found in the Far East, during the classification of the rubber. This point emphasizes the fact that TC rubber is offered on the basis of a division of the existing variation into three reasonably uniform classes and not on the basis of a precise specification in delivery. The change which occurs during storage is small, and consumers should, in actual practice, find no difficulty in relating the classification markings to their own test results.

The subject of "Recent Developments in the Evaluation of Natural Rubber" was discussed at the Symposium sponsored by Committee D-11 at the ASTM meeting in New York, June 26, 1952. The eight papers presented are reported in India Rubber World (50) and will be published in full by the Society.

Bibliographies on technically classified rubber which cover most of the postwar literature on the subject have been prepared by Bekkedahl (51), Newton (52), and others (53). A general account of the subject has been presented by Mann and Newton (54).

Natural Rubber Latices

There are various forms and concentrations of natural rubber latices. Normal latex (38-40% solids) is no longer generally used in the United States. Heat concentrated latex (70-73% solids) has relatively limited commercial application in this country. Concentrated, ammonia preserved, creamed latex (60-65% solids) and centrifuged latex (58-63% solids) are the principal forms used. Within the past few years another concentrated latex (solids content about 62%), obtained by an electro-decantation process, has been established. The various forms of latices, solids content, suppliers, and brand names are listed in Table 4.

The "normal" latex of commerce, as described by Vila (55), is latex, which is collected from the tree, to which has been added gaseous ammonia as a preservative, and blended in bulk storage facilities to an average solids of 38-40%.

Table 4. Natural Rubber Latices

Type	% Solids Content	Type	% Solids Content	Type	% Solids Content	Type	% Solids Content
Centrifuged latex	58-63	Creamed latex	60-65	Heat concentrated latex	70-73	Normal latex	38-40
Suppliers	**Brand**	**Suppliers**	**Brand**	**Suppliers**	**Brand**	**Suppliers**	**Brand**
American Anode, Inc.	*	Balfour, Maclaine, Inc.	Lacretex	American Anode, Inc.	*	Harrisons & Crosfield (America)	H & C Latex
Balfour, Maclaine, Inc.	Lacentex	Heveatex Corp.	Heveatex	General Latex & Chemical Corp.	*	Latex & Rubber, Inc.	Soctex
General Latex & Chemical Corp.	*	Latex & Rubber, Inc.	Soctex	Rubber Corp. of America	Revertex	Rubber Corp. of America	*
Harrisons & Crosfield (America)	H & C Latex	Naugatuck Chemical Division, United States Rubber Co.	NC-356			Balfour, Maclaine, Inc.	Lanortex
Heveatex Corp.	Heveatex						
Latex & Rubber, Inc.	Soctex						
Naugatuck Chemical Division United States Rubber Co.	NC-401						
Rubber Corp. of America	Ray						
Southern Latex Corp.	*						
Charles T. Wilson, Inc.	Dunlop						
Xylos Rubber Co.	*						

* Brand name not available.
Note: Electro-decanted latex at 62% solids is also available in semi-commercial quantities from Charles T. Wilson, Inc.

Suppliers' Names and Addresses

American Anode, Inc., 60 Cherry St., Akron, O.
Balfour, Maclaine, Inc., 71 Water St., New York 5, N. Y.
General Latex & Chemical Corp., 666 Main St., Cambridge 39, Mass.
Harrisons & Crosfield (America), Inc., 17 E. 42nd St., New York 17, N. Y.
Heveatex Corp., 78 Goodyear Ave., Melrose 76, Mass.
Naugatuck Chemical Division of United States Rubber Co., Naugatuck, Conn.
Rubber Corp. of America, 274 Ten Eyck St., Brooklyn 6, N. Y.
Southern Latex Corp., Austell, Ga.
Charles T. Wilson Co., Inc., 120 Wall St., New York 5, N. Y.
Xylos Rubber Co., Box 2667, Firestone Park, Akron 1, O.
Latex & Rubber, Inc., 1075 Hull St., Baltimore 30, Md.

Heat concentrated latex, of which Revertex[6] is a well-known example, is prepared, as explained by Twiss *et al.* (56), by heating the latex in heated revolving drums to a solids content of 70 to 73% in the presence of a mineral alkali (potassium hydroxide) or other permanent stabilizing agent such as potassium soap or other salt of colloidal character. This latex is of a creamy consistency. Because of the nature of the process no purification is effected. The presence of the extra stabilizer produces a soft tacky film when the latex is dried down.

Concentrated latex may be obtained mechanically by centrifuging. Normal latex preserved with ammonia is passed through a centrifuge and separated into two approximately equal volumes of fluid; the inner layer contains about 62% solids; the outer, about 11%. The centrifuging process also purifies the latex because a higher proportion of serum and all suspended foreign matter are retained in the skim.

Concentrated latex may, as reported by Noble (57) and by Gibbons and Brass (58), be obtained by the addition of various organic colloids, strongly hydrophylic, to produce a grade known as "cream." Commonly, organic colloids such as Karaya gum, locust bean gum, gum Tragacanth, Iceland moss, alkali solutions of alginic acid and similar materials are used. The mechanism of creaming of latex by these materials appears to consist in the adsorption of these gums on the surface of the latex particle, thus increasing their size to such an extent that the Brownian movement is stopped, and the particles move to the top, because of the difference in specific gravity between the particle and the aqueous medium. Two layers are formed; the upper layer consists of a cream in which most of the rubber is present; and the lower consists of serum, mostly non-rubber materials. Creaming may be hastened by heating to about 60° C.

The chemical creaming process, according to Vila (55), tends to purify the rubber, as with centrifuging, insofar as the lower layers are proportionately richer in serum, containing the non-rubber constituents. This is offset for many practical purposes, however, by the presence of the water soluble creaming agent. The presence of the creaming agent also makes "cream" somwhat more viscous than centrifuge for a given solids content.

Another method of concentrating latex is by the electro-decantation process whereby, according to Murphy (59, 60), the latex is continuously separated into cream and serum layers by subjecting it to a small electrical potential between closely spaced vertical semipermeable membranes. According to Murphy (60), the separating units can now be operated continuously for more than 170 hours at an overall operating efficiency of 97% based on the dry rubber content in the final product.

Whereas the efficiency of creaming agents depends on their ability to increase the unit size, the electro-decantation process, according to Stevens (61), depends on the formation of denser or lighter layers containing massed particles, whose movement under gravity is less restricted than when dispersed in a large volume of liquid. This latter process differs from creaming in that it not merely causes the particles to accumulate in a denser layer on the surface, but causes the serum to form as a relatively rubber-free liquid underneath.

Electro-decanted latex bears a general resemblance to centrifuged latex in viscosity and absence of after-creaming. There are, however, significant differences between them; thus the potassium hydroxide and conductivity values tend to be higher, and the mechanical stability is usually appreciably higher.

The properties of normal latex, creamed latex, centrifuged latex, and heat-concentrated latex are summarized in "Compounding Ingredients for Rubber."

The following values are typical for latices at various concentrations.

% Solids Content	Specific Gravity Wet Latex	Weight of U. S. Gal. Latex in Lbs.	Weight of Total Solids in U. S. Gal. Lbs.
38	0.9735	8.120	3.085
40	0.972	8.11	3.244
58	0.9594	8.002	4.641
60	0.958	7.99	4.794
63	0.9560	7.972	5.022
65	0.9545	7.96	5.173
70	0.951	7.93	5.551

Latex is generally examined for total solids—%; dry rubber content, DRC—%; total solids content minus dry rubber content—%; total alkalinity—calculated as ammonia and expressed as a percentage of the water in the latex; viscosity—centipoises; sludge content—% of wet weight; coagulant content—% of total solids; yield point—cg/cm^2; surface tension—dynes/cm; KOH number; mechanical stability—min., seconds; copper content—% of total solids; copper on film; manganese content—% of total solids; manganese on film; color on visual inspection; color of dry film; odor after neutralization with boric acid; odor of dried film; and filterability—gallons per sq. ft.

Tentative Specifications and Methods of Test for Concentrated, Ammonia Preserved, Creamed and Centrifuged Natural Rubber Latex are given in ASTM D1076-49T (62).

The principal specifications under which "normal" centrifuged and "cream" latex are sold are presented by Vila (55).

[6]Brand name of Rubber Corp. of America, 274 Ten Eyck St., Brooklyn 6, N. Y.

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(To be continued)

Editorials

International Commodity Agreement on Rubber Not Favored by the United Staes

IN THIS column last month India RUBBER WORLD tried to warn the natural rubber industry that the sellers' market in rubber was a thing of the past and that any improvement in earnings for that industry would depend on greater sales volume made possible by more aggressive selling of a higher-quality product supplemented by adequate technical service to consumers. It was pointed out that the synthetic rubber industry in the United States may be in private hands in a year or two and then synthetic rubber, to an even greater extent then heretofor, will be sold and serviced in this country in the same manner as other chemical products, and that natural rubber selling and service would suffer by comparison.

A large part of the natural rubber industry, however, apparently still clings to the belief that improvement in the earnings of that industry may best be assured by some sort of international commodity agreement whereby the consumers would agree to buy a certain amount of rubber that the producers would agree to provide.

Following the ninth meeting of the International Rubber Study Group, in May, 1952, in Ottawa, Canada, a so-called Working Party was established to consider measures to prevent surpluses and shortages of rubber and to prepare drafts of any agreements that might be considered desirable to prevent such shortages and surpluses. The Working Party met in London, England, in August and recessed without agreement, but another meeting is now scheduled for January, 1953.

Meanwhile the natural rubber industry abroad, aided and abetted by statements made in Volume 1, Chapter 15, entitled "Reducing Market Instability," of the President's Materials Policy Commission Report of June, 1952 (Paley Commission Report), and also from other agencies of the executive branch of the government, is assuming that the official American attitude toward international commodity agreements is a favorable one.

The statements from the above-mentioned Paley Commission Report on which the natural rubber industry abroad is placing too much hope for favorable American commodity agreement action include the following:

"The international arrangements that hold the greatest promise for stabilizing markets and, at the same time, for promoting the increased production of materials that the future will demand are the multilateral contract of agreement and buffer stock agreements either without or with quota provisions on export or production. . . .

"The Commission believes further that, despite the clear difficulties of negotiation and the fact that the United States would be called upon to finance a considerable share of the costs, commodity agreements of the type indorsed hold sufficient promise of reducing materials market instability and its harmful consequences to free nations to merit serious consideration and efforts to work out, as tests, stabilization agreements with other countries for a few materials. . . . ."

Then there was the *London Economist* Foreign Report issue of September 18, which had the following to say about what it called "the new and positive American attitude" on international commodity agreements.

"At the recent rubber talks in London, for instance, where both producing and consuming countries were examining the possibility of an international agreement, America was for the first time in favour of it—a complete reversal of policy from all previous postwar negotiations on rubber which may have far-reaching political effects.

"The Americans have not yet worked out the details of their commodity policy. They have merely accepted the view that foreign and commercial policies must be complementary if the free world is to prosper. Moreover, the State Department has now got the Paley Report to back some of its contentions. . . . ."

India RUBBER WORLD has it on good authority, however, that the official United States opinion on international commodity agreements has *not* changed. There is indeed a desire to have a more stable price for natural rubber, but it has been demonstrated in the last few years that the existence of the American synthetic rubber industry is much more effective than any commodity agreement, in this connection.

John L. Collyer, president of The B. F. Goodrich Co., in his July, 1952, report entitled, "The Rubber Outlook and a Study of Cartels and Their Consequences," would seem to have most effectively answered the two questions before the Working Party of the IRSG, that is, whether measures designed to prevent burdensome surpluses or serious shortages of rubber are necessary, and (2) whether such measures are practicable. Collyer has provided ample data to show that there is little likelihood of either a serious shortage or surplus of rubber in the next few years and why international commodity agreements are not practical for any kind of rubber.

American representatives to the January, 1953, meeting of the Working Party of the IRSG would do well to review the Collyer report. First, they will have to correct the impression abroad that the American attitude on such agreements has changed and then convince other members of the Working Party that an international commodity agreement on rubber is neither necessary nor practical. The Collyer report should be most helpful in this latter connection.

R. G. Seaman

Evaluation of Plasticizer Performance in Vinyl Resins[1]

Temple C. Patton[2]

A PLASTICIZER is normally added to a resin for one or both of the following major reasons: (1) to promote workability of the resin during processing; and (2) to impart permanent flexibility to the resin after processing. Only the latter function is considered in this paper, and the discussion is further limited to the effects of the plasticizer on the end-properties of plasticized polyvinyl chloride and copolymer resins. The flexible systems treated herein will have a substantial amount of plasticizer present (on the order of 20% or more), which automatically eliminates rigid or semi-rigid vinyls where a small amount of plasticizer may be added to confer toughness, shock resistance, or other special property.

To date, some 20,000 plasticizers have been listed in the chemical literature (1).[3] Of this staggering number of products, about 1% have proved to be commercially useful. In a recent compilation (2) of commercial plasticizers, some 238 products are listed as having manufacturing importance. Of this lesser number, only a small fraction has achieved volume usage. Thus, five or six plasticizers account for about 50% of current plasticizer production, and less than a dozen account for 60% of current production (3).

With these statistics in mind, it can be realized that a knowledge of how to evaluate the performance of a plasticizer is important not only to screen out products obviously incapable of competing with recognized plasticizers of known utility, but also to ascertain those fine gradations of performance which determine where and how a new plasticizer will fit into the scheme of things. Of the three factors of performance, price, and availability which normally determine the eventual sales of a product, performance is a vital key. A sound evaluation of plasticizer performance, therefore, is a prerequisite for the judicious promotion of a plasticizer product.

At the present time about 150,000,000 pounds of plasticizers, or about two-thirds of annual domestic plasticizer production, are used in vinyl resins. Hence the statements made herein on the evaluation of plasticizer performance in vinyls apply to the major portion of our total plasticizer business.

[1] Presented before the Division of Paint, Varnish & Plastics Chemistry, American Chemical Society, Milwaukee, Wis., Mar. 31, 1952.
[2] Chief, sales service department, Baker Castor Oil Co., Bayonne, N. J.
[3] Numbers in parentheses refer to bibliography at end of article.

Evaluation of Plasticizer Properties

Since a plasticizer does not lose its chemical identity in the resin or plastic to which it is added, it carries into the plasticizer-resin system its own unique characteristics of color, odor, toxicity, flammability, solubility, volatility, and chemical reactivity. Since we are here considering systems containing a substantial amount of plasticizer, it is quite possible roughly to estimate in advance what effect the addition of plasticizer to a resin will have on the ultimate performance properties.

Thus, in proportion to its presence, a toxic plasticizer will produce a toxic product; a volatile plasticizer will produce a product with transient flexibility; and so on. Normally, a resin can only alleviate or minimize any such adverse factors by virtue of its dilution effect, or by mechanically impairing the diffusion of plasticizer to the surface of the compound.

Even before any compounding is done, it is possible to establish certain ideals of performance which a plasticizer should approach or attain. These ideals are as follows: colorless, odorless, non-toxic, non-flammable, insoluble in water, non-volatile, and non-reactive. Since the plasticizer will very nearly bestow its own performance intact to the resin, pre-evaluation of plasticizer properties may automatically preclude further testing of a given product.

In the listing of performance properties given in the preceding paragraph, it is noteworthy that a negative or complete lack of contribution is equivalent to perfect plasticizer performance. Ideally, then, other than imparting the positive property of flexibility to the end product, a plasticizer should be a faceless ingredient, negative and inert.

To show more specifically how an inherent property of a plasticizer is carried over into the plasticized system, we can select the property of volatility. Reed (4) notes that the volatile loss of a plasticizer from a vinyl film is closely related to its boiling point and states that a plasticizer should have a boiling point above 200° C. at a pressure of four millimeters of mercury to have sufficient permanence for most applications. It is possible to go even further and roughly estimate the weight loss of plasticized PVC-type film or sheeting with time by correlating this loss in weight with the vapor pressure of the plasticizer.

In his article (4) Reed gives a table listing the 10-day weight losses of four-mil plasticized films at 60° C., together with the vapor pressures at 150° C. of different plasticizers. From the data in this table we can empirically develop the following approximate formula or equation relating film weight loss with plasticizer vapor pressure:

$$\text{(I)} \qquad W = 21\ p^2$$

where W = percentage weight loss of four-mil plasticized film at 60° C. during a 10-day period

p = Vapor pressure of the plasticizer, in millimeters of mercury, at 150° C.

A comparison of volatile losses for 13 plasticizers, as calculated from equation (I) with losses as actually measured by Reed (4), is given in Table 1 and shows the equation to give good approximation.

TABLE 1. RELATION OF PLASTICIZER VAPOR PRESSURE AND FILM VOLATILITY

(Original Plasticizer Contents, 25-35%)

Plasticizer	Plasticizer Vapor Pressure at 150° C., Mm. Mercury	Volatile Loss (% Weight) from Four-Mil Vinyl Film after 10 Days at 60° C.	
		Actual	Calculated
Dibutyl phthalate	1.00	19.9	21.0
Santicizer M-17	0.92	17.5	17.8
Arneel TOD	0.60	8.2	7.6
Dibutyl sebacate	0.60	7.2	7.6
Methox	0.50	6.6	5.3
Di-2-ethylbutyl phthalate	0.50	4.4	5.3
Santicizer B-16	0.24	3.3	1.3
Flexol TOF	0.23	1.3	1.3
Kronisol	0.16	2.1	0.5
Flexol DOP	0.16	0.7	0.5
Di(methylamyl Cellosolve) phthalate	0.13	1.1	0.4
Di(2-ethylbutyl Cellosolve) phthalate	0.13	0.5	0.4
Tricresyl phosphate	0.04	0.2	Below 0.1

The following equation, given by Reed (4), relates weight losses for different film thicknesses, aging periods, and exposure temperatures:

$$\text{(II)} \qquad W_2 = W_1 \cdot \frac{t_2 d_1}{t_1 d_2} \cdot 10^{(0.0142)} \cdot (T_2 - T_1)$$

where W_2 and W_1 = percentage weight losses at conditions 1 and 2

t_1 and t_2 = times of exposure, in years

d_1 and d_2 = film thicknesses, in mils

T_1 and T_2 = exposure temperatures, °C.

By substituting the W value of equation (I) for the W_1 of equation (II), and substituting the numerical values for the test conditions into equation (II), we arrive at the following simplified equation:

$$\text{(III)} \qquad W = \frac{p^2 t}{d}$$

where W = fractional loss in weight of film at 76° F. (24.5° C.)

p = plasticizer vapor pressure at 150° C., in mm. mercury

t = aging period, in years

d = thickness of film or sheeting, in mils

This relationship is submitted as a rule-of-thumb equation for approximately predicting the loss in weight of vinyl film or sheeting owing to plasticizer volatilization over a period of years at a room temperature of 76° F. This equation applies only to PVC-type films with an original plasticizer content of 25% or more, since total loss is limited by the amount of plasticizer initially in the film.

A check on the validity of equation (III) can be made by comparing measured volatile losses from four-mil vinyl films containing dibutyl sebacate (DBS), di-2-ethylhexyl phthalate (Flexol DOP), and tricresyl phosphate (TCP) as plasticizers with losses calculated from the equation. Thus Table 2 compares extrapolated values derived from Reed's measurements (4) with calculated values and shows the equation to give good approximations.

TABLE 2. COMPARISON OF MEASURED AND CALCULATED ANNUAL VOLATILE LOSSES (IN % WEIGHT) FROM FOUR-MIL FILM

Plasticizer	Measured	Calculated
DBS	11.0	9.0
DOP	0.6	0.6
TCP	0.2	Below 0.1

Again, in comparing plasticizers with widely differing volatilities, it can be computed that a dibutyl phthalate plasticized vinyl sheeting 20 mils thick suffers a 5% annual weight loss; whereas a tricresyl phosphate plasticized vinyl of equivalent thickness shows a negligible annual weight loss of less than 0.01%.

If on the basis of the previous listing of inherent plasticizer properties a plasticizer is given a passing performance grade, it is interesting next to check briefly on how it fits into certain other plasticizer data brackets. For example, a survey of available data on plasticizers now in common use (2) shows that three out of four plasticizers are liquids; two out of three are liquids having a freezing point below 0° C.; two out of five have molecular weights between 300 and 400; four out of five have molecular weights between 200 and 500; and no plasticizer is listed with a molecular weight below 100. On this basis a liquid plasticizer with a molecular weight over 200 (preferably about 350) lies in the range which has furnished most of our currently successful plasticizers. This method, of course, only denotes probability and in no way precludes the development of successful vinyl plasticizers outside these limitations.

Evaluation of Plasticized Vinyl Resins

Since a plasticizer can only perform its function in conjunction with a resin, the final evaluation of plasticizer performance must ultimately be based on the plasticized system. A true measure of plasticizer performance is the degree of flexibility it imparts to the final compound. In the case of unsupported films this flexibility is variously referred to as pliability, suppleness, elongation, stretch, drape, hand, or feel.

To assess accurately this flexibility factor, there are now many recognized test methods in use (5, 6). These tests are here classified into the following three categories for review:

(1) Flexibility measured directly: stretching, bending, twisting;

(2) Flexibility evaluated indirectly in combination with other properties: tearing, cracking;

(3) Flexibility change inferred from measurements of plasticizer loss: volatility, leaching, migration.

Let us consider these classes in turn and briefly discuss the evaluation procedures which have been evolved within each group.

Flexibility Measured Directly

A flexible material can be stretched, bent, or twisted, and each type of distortion now has its counterpart in a recognized test procedure. Table 3 outlines some direct procedures which have been developed to evaluate flexibility.

The question now arises as to what values of E can be considered as acceptable in the evaluation of plasticizer performance. Based on considerable experience, it would

appear that an E value of 1,000 psi. at 25° C. for a PVC stock plasticized with 35% plasticizer is a reasonable norm. A plasticizer having an E value of 500 psi. under these specific conditions would be on the superlative side; whereas one having a value of 5,000 psi. would have to contribute some special feature (such as inexpensiveness, non-flammability, etc.) to warrant further consideration. For example, dioctyl phthalate and methyl acetyl ricinoleate, widely used as primary and secondary plasticizers, respectively, have E values of 870 and 690, respectively, which place them on the side of the better plasticizers.

TABLE 3. TEST METHODS FOR DIRECTLY MEASURING FLEXIBILITY

Type of Stress	Test Designation	Formula Relationship*
Stretching	ASTM D882-49T	$E = \frac{F/A}{\Delta l/l}$
Bending	ASTM D747-50	$E = \frac{4Fl^3}{wd^3 \Delta f}$
Twisting	ASTM D1043-51	$E = \frac{(2750)Tl}{wd^3 n \phi}$

*Note: E = modulus of elasticity; F = force; T = torque; A = area; l = length; w = width; d = thickness; n = value related to w/d; Δl = elongation; Δf = distance of bend; ϕ = angle of twist

All plasticized systems stiffen with a drop in temperature and, here again, measurement of E values at lower temperatures can be of service in screening out less satisfactory plasticizers. Clash and Berg (7) in their low-temperature study of vinyl elastomers empirically selected an apparent modulus of elasticity value, E, of 135,000 psi. as the borderline between the rigid and the non-rigid conditions. Using this criterion, the flex or stiffening temperatures (corresponding to the temperatures at which this 135,000-psi. E value is reached) for various plasticizers, as reported by Reed (4, 8), are shown in Table 4. This table also shows the E values at 25° C. under 100-psi. stress for these same films.

TABLE 4. STIFFENING TEMPERATURES OF PVC WITH VARIOUS PLASTICIZERS (35% Plasticizer Content)

Plasticizer	Common or Trade Name	Plasticized Resin: Stiffening Temperature, °C.	Plasticized Resin: Calculated E Value at 25° C., Psi.
Di-2-ethylhexyl sebacate	DOS	−63	830
Dibutyl sebacate	DBS	−59	500
Tri-2-ethylhexyl phosphate	Flexol TOF	−55	790
Triethylene glycol di-2-ethyl hexoate	Flexol 3GO	−44.5	740
Methyl acetyl ricinoleate	Flexricin P-4	−38	690
Cellosolve acetyl ricinoleate	Flexricin P-4C	−37	830
Dibenzyl sebacate	....	−31	640
Dibutyl phthalate	DBP	−26	550
Dicapryl phthalate	DCP	−21	1,050
Di-2-ethylhexyl phthalate	Flexol DOP	−19.5	870
Methyl phthalyl ethyl glycolate	Santicizer M-17	− 7.5	960
Cyclohexyl lactate	......	+ 1	2,380
Tricresyl phosphate	TCP	+ 5	1,050
Chlorinated hydrocarbon	Halowax 4001 B-2	+ 4	4,350
Biphenyl	Arochlor 1248	+13	4,350
Hydroabietyl alcohol	....	+30	10,000

An inspection of this listing reveals two obvious facts: (1) plasticizers vary enormously in their ability to impart low-temperature flexibility; and (2) there is only a casual relationship between flex at room temperature and flex at low temperature. This points up the importance of always running some sort of flex test at low temperatures to supplement flex data obtained at room temperature. Most companies now furnish both types of flex data when promoting a new plasticizer.

Flexibility Evaluated Indirectly

In addition to flexing, vinyl film and sheeting in service are subjected to other strong stresses which are often difficult to characterize. Thus ripping, puncturing, tearing, cracking, shrinking, etc., are all rather complicated phenomena not readily amenable to simple mathematical treatment. It is recognized, however, that flexibility is a factor in resisting such stresses and, along with other contributing factors, exerts an influence in opposing these distorting forces.

Table 5 gives representative procedures which have been developed to evaluate the resistance of a film to mixed stresses and, indirectly, the part played by the plasticizer in the film. Although these testing procedures have been somewhat arbitrarily set up and rated for performance by the industry, they do in some measure evaluate film flexibility.

TABLE 5. TEST METHODS FOR EVALUATING FLEXIBILITY INDIRECTLY (IN COMBINATION WITH OTHER PROPERTIES)

Type of Stress	Test Designation	Description
Tearing: Slow	ASTM D1004-49T SPI 3.7.1, 4.5, 3.9, and 4.8	Application of a slow constant rate of tear of 20 inches per minute on special died-out specimens.
Tearing: Rapid	ASTM D689-44 SPI 3.7.2 and 4.6	Imposition of a quick tearing or sudden ripping action on a film.
Cracking	ASTM D746-51T	Impact blow by 1/16-inch radius edge on chilled cantilever portion of specimen (rate 6-7 feet per second).
	SPI 3.11, 4.10, 3.8, and 4.7	Impact by flat hammer blow on a loop of chilled plastic.
Shrinking	SPI 3.1 and 4.2	Free shrinkage of film after 30 minutes at 100° C.

Flexibility Change Inferred from Plasticizer Loss

As previously stated, a major reason for the addition of plasticizer to a resin is to impart permanent flexibility. Solvents, for example, impart initial flexibility, but do not rate as plasticizers because of their volatility and impermanence. Since a plasticizer must stay put, any action that tends to remove the plasticizer from the resin must automatically reduce film flexibility.

A plasticized vinyl film can lose plasticizer by at least three mechanisms, depending on whether it is in contact with a gas, liquid, or solid. The first type of loss is exemplified by the free volatilization of plasticizer into the atmosphere, or the exudation of plasticizer to the film surface as a liquid; the second type by the leaching effect of water; and the third type by the migration of plasticizer into lacquered or varnished surfaces. In the third case the effect produced on the solid surface may be much more serious, consumerwise, than the actual loss in flexibility.

Except for plasticizer exudation or migration, the transfer of plasticizer from a film to its environment is of interest primarily because such loss means a reduction in film flexibility. As a result, tests involving plasticizer loss are almost always interpreted in terms of a corresponding loss in film flexibility. The procedures shown in Table 6 are representative of tests measuring plasticizer loss.

TABLE 6. TEST METHODS BY WHICH FLEXIBILITY CHANGE MAY BE INFERRED FROM PLASTICIZER LOSS MEASUREMENTS

Type of Action Causing Loss	Test Designation	Description
Volatilization (into gas)	SPI 3.8, 4.7, 3.10, and 4.9	Absorption of volatilized plasticizer by activated carbon in a closed container.
	ASTM D742-46T, D744-49T, D745-44T, D794-49 and D948-47T	Volatilization of plasticizer into a stream of hot circulating air.
Exudation or Spewing (into gas)	No standard test has been sponsored although independent laboratories have set up procedures to determine the exudation tendencies of plasticizers.	
Leaching (into liquid)	ASTM D570-42 SPI 3.10, 4.9, 3.11, and 4.10	Immersion into water. Determines both leaching and water absorption.
	ASTM D543-43	Immersion into standard organic and inorganic reagents. Determines leaching, absorption, and chemical resistance.
Migration (into solid)	SPI 3.4 and 4.3	Migration of plasticizer (by direct contact) from film to lacquered or varnished surface.

Other Considerations

The simplified approach that has been taken here to the evaluation of plasticizer performance in vinyl resins has been based on (1) a consideration of the inherent properties of the plasticizer itself; and (2) a consideration of the contribution which the plasticizer makes to permanent film flexibility. This evaluation system admittedly does not cover all facets of plasticizer performance, but it is believed that the more important considerations governing acceptable performance are covered. To the above may profitably be added procedures which evaluate how the addition of plasticizer to the vinyl film affects such properties as abrasion or crocking resistance, optical qualities, electrical characteristics, gas permeability, flammability, and heat sealability. Most of these added tests, however, are optical in nature.

A complete evaluation program will also include more or less extensive accelerated aging programs to attempt to ascertain the deteriorating effects of ultra-violet light, oxidation, attack by fungi and bacteria, and resistance to temperature and humidity changes. Such aging tests are mandatory for assessing the benefits conferred to the plasticized film by such additives as stabilizers, oxidation inhibitors, anti-spew agents, ultra-violet light absorbers, fungicides, and bactericides.

Evaluation of plasticizer performance after any aging period will fall along the same lines as for pre-aging evaluation. Once initial unaged values have been established, plasticizer performance after aging can be reported either in terms of absolute aged values or in terms of percentage changes which have occurred. No new testing procedures, however, are required other than those already outlined for pre-aging tests.

Summary and Conclusions

This review has attempted to outline systematically selected procedures currently used for the evaluation of plasticizer performance in vinyls. It is true that many of the test methods are still undergoing revision and are still in the "tentative" or "proposed" stage. Even some of the descriptive words used in the vinyl industry are still awaiting exact definitions. However the standardization of test procedures is now well under way, and, from now on, standard tests will be of utmost value in maintaining the health of this large and growing industry.

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Meetings and Reports

ASTM Committee D-20 on Plastics Holds Fall Meeting

THE fall meeting of Committee D-20 on Plastics, American Society for Testing Materials, and its subcommittees was held October 28 and 29 at the Kenmore Hotel, Boston, Mass. Some 60 members and other interested persons attended the meeting, presided over by Chairman Ralph K. Witt, Johns Hopkins University, assisted by Secretary G. M. Armstrong, Tennessee Eastman Corp.

Committee D-20 Meeting

The full committee meeting was held on the afternoon of October 29, with about 40 members attending. Membership Secretary B. L. Lewis, Tinius Olsen Testing Machine Co., reported that the Committee has nine new members and four resignations since the June meeting. He also requested all subcommittee chairmen obtain up-to-date membership lists.

Reports were presented of the subcommittee meetings, as given below. Committee E-1 has requested that the subject of bend testing be investigated, and this matter was referred to Subcommittee I. Subcommittee X-A asked for suggestion as to additional terms for definitions.

P. J. Smith, of the Society's staff, stated that the new compilation of plastics standards was awaiting the results of this fall meeting and was expected to be published late in December. The Committe voted to include four paper tests, D643, D689, D774, D988, used in plastics film testing, in the new compilation of standards.

G. M. Kline, National Bureau of Standards, and W. A. Zinzow, Bakelite Co., who were members of the United States delegation, reported on the meeting of the International Standards Organization Committee on Plastics, ISO/TC-61, on October 2-4 in Turin, Italy. Dr. Kline reported that 60 delegates representing nine nations attended the meeting. Results accomplished by the five working groups were as follows: physical and chemical methods group, agreed with ASTM methods in most details; mechanical strength group, arrived at a proposed flex method that agrees with ASTM; thermal properties group, heat distortion method proposed in accordance with ASTM method; conditioning group, agreed on conditioning method using 65% relative humidity instead of 50% used by ASTM; and nomenclature group, is preparing a glossary of plastics terms for the various languages. Dr. Kline also said that the groups decided to hold meetings at least once a year and to rotate the chairmanships among the various nations represented every three years.

Dr. Zinzow emphasized that Europeans have a very high regard for ASTM methods, and that this esteem further increases the responsibility of the Society in preparing standards on materials and testing. He announced that the Society's committee working in cooperation with ISO/TC-61 will hold a meeting on November 14 in Philadelphia, Pa.

Dr. Witt announced that D-20 will hold its spring meeting on March 22-24 at Pocono Manor, Pa., and its fall meeting at Roanoke, Va.

Subcommittee Meetings

Subcommittee I—Strength Properties. R. M. Berg, Carbide & Carbon Chemicals Co., chairman. A round-robin has been completed on the tensile testing of rigid sheeting for D882-49T, using three types of machines: (A) constant rate of load; (B) constant rate of jaw separation; and (C) pendulum type. None of the three types of machines appeared consistently more reproducible than the others, and ultimate elongation was much less reproducible than either tensile or elastic modulus, regardless of type of machine. Rigid plastics of 40-mil thickness can be tested satisfactorily by methods B and C, but are beyond the capacity of type A machines. A study is also under way on the comparison of Izod and Charpy methods for impact testing.

Subcommittee II—Hardness Properties. H. L. McChesney, Monsanto Chemical Co., acting chairman. The group voted to overrule the single negative vote recorded in the recent D-20 ballot on a proposed abrasion resistance test method on the grounds of irrelevancy. It was voted to submit the proposed method to the standards committee. It was also voted to change the name of Section A from "Rockwell Hardness" to "Indentation Hardness." Section A will check on the Admiralty hardness tester and its useful-

ness for elastomerics. The present method for scratch resistance was said to be too complicated and to give irreproducible results, and further study of this method was proposed.

Subcommittee III—Thermal Properties. C. H. Adams, Monsanto, chairman. A round-robin is planned to investigate the SPI flammability tester. The proposed method for using the melt indexer to determine flow of thermoplastics is in process of approval. On the subject of low-temperature brittleness, it was noted that available tests, such as the Masland Duraleather method, are not too sensitive and are more suitable as a specification test by purchasers of film. On the other hand the ASTM test, D746, is somewhat more precise, but applicable only to thicker material. Further study of the Masland test is planned.

Subcommittee IV—Optical Properties. H. K. Hammond, NBS, chairman; **George Ingle,** Monsanto, acting chairman. Preliminary reports on the poll of subcommittee members as to current optical standards show D307 and D791 (color) to be unsatisfactory; D881 (line of sight) apparently not in use; D1003 (haze and luminescent transmission) becoming popular; and D636 (dispersion) and D637 (surface irregularity) apparently not in use. The materials committee will be contacted to determine if the glass industry is using D636; otherwise its elimination will be recommended. Preliminary work on color differences indicates that the simplified McAdams equation gives better results than the Adams-Nickerson equation. Work is in progress on the calibration and standardization of haze samples.

Subcommittee V—Permanence Properties. J. W. Mighton, Dow Chemical Co., chairman. The water permeability method written by Committee E-1 is under study. Proposed method D543 on resistance of plastics to chemical reagents has been approved by the subcommittee and will be sent to D-20 letter ballot. The proposed test method for shrinkage of thermosets has been approved by the group and will be sent to D-20 letter ballot. Planned work on outdoor weathering will be coordinated with the SPI program.

Subcommittee VI—Specifications. Lucius Gilman, Picatinny Arsenal, chairman. The proposed revision to D700, phenolic molding compounds, has received D-20 letter ballot approval and will now be sent to the standards committee. Work on rubber-modified phenolics has been discontinued at the request of the suppliers. Method D705 on ureaformaldehyde molding compounds is not realistic for current general-purpose compounds with regard to strength, and it may be necessary to specify molding conditions. Proposed revision to D708 on rigid vinyl sheets has received subcommittee approval and will be sent to D-20 letter ballot. A study is planned on the effect of specimen shape and molding condtions on polystyrene heat distortion temperature. Work has begun on a specification for high-impact styrenes. A study is being made on the proposed revision to D787 on ethyl cellulose molding compounds to determine the need of specifying deformation under load. Proposed revisions to D742 (non-rigid vinyl chloride-acetate) and D744 (non-rigid polyvinyl chloride) will be combined into one specification after consideration of Committee D-11's work on non-rigid vinyls. The proposed specification for nylon plastics is being sent to D-20 letter ballot. Proposed specification D700 on polyethylene molding and extrusion compounds has received D-20 approval and will be sent to the standards committee. Proposed specification for octyl phthalate ester plasticizers has received D-20 approval, but will receive further subcommittee study on chemical requirements before any action is taken.

Subcommittee VII—Analytical Methods. H. E. Riley, Bakelite, chairman. Proposed methods for determining chlorine content and volatile content of vinyls have received D-20 approval and will be sent to the standards committee. The proposed method for specific viscosity of vinyls did not receive D-20 approval and will be given further study.

Subcommittee VIII—Research. C. R. Stock, American Cyanamid Co., chairman. The following three papers were presented at this session: "Data and Their Interpretation," R. B. Finch, Massachusetts Institute of Technology; "A Constant Strain Stiffness Tester for Thin Plastic Films," F. D. Dexter, Bakelite (paper read by Dr. Zinzow); and "Accelerated Exposure Techniques," L. Boor, Philadelphia Quartermaster Depot.

Professor Finch gave an introductory talk on the application and value of statistical methods to the presentation and interpretation of technical data.

Dr. Dexter's paper described a new instrument for determining stiffness or apparent modulus of elasticity in elastomeric film and sheeting. With this apparatus a known strain is quickly applied to an annular specimen, and the load required to maintain this strain is measured by a strain gage bridge. The modulus is computed from the load, specimen thickness, and strain. The test is sensitive, easy to run, and requires about two minutes.

Mr. Boor gave a progress report on an accelerated weathering program using a Fade-O-Meter modified to improve control of relative humidity and ambient temperature. Work to date on standard paper samples shows relative humidity greatly to affect reflectance properties.

Subcommittee IX—Molds and Molding. J. L. Williams, Dow, chairman. Questionnaires are being prepared to check the need of further work on determination of mold shrinkage. It was decided that the subject of product shrinkage is more properly an SPI matter, rather than ASTM's. A round-robin is in progress testing transfer molds for test specimens.

Subcommittee X—Definitions and Nomenclature. C. H. Alexander, B. F. Goodrich Chemical Co., chairman. New definitions for "alkyd plastics," "polyester plastics," "halocarbon plastics," "resin," "pseudostable," and "volatile loss" were approved and will be sent to D-20 letter ballot. The "volatile loss" and "pseudostable" definitions will be sent to both D-20 and E-9 letter ballots.

Subcommittee XIV — Conditioning (Joint with D-9). A. C. Webber, E. I. du Pont de Nemours & Co., Inc., chairman. A study is being planned on available methods and instruments for measuring relative humidity.

New England District Plastics Meeting

In conjunction with the D-20 meeting, the Society's New England District held its fall dinner-meeting on October 28 at the Hotel Commander, Cambridge. Some 150 members and guests attended the meeting, which featured talks by Drs. Witt and Kline. District Chairman H. H. Lester, Watertown Arsenal, presided over the meeting and introduced the speakers, as well as Mr. Smith of ASTM and A. H. Scott, NBS and chairman of D-9.

Dr. Witt spoke on the engineering applications of plastics, with special emphasis on the newer materials such as foams, vinyl pyrrilidone as a blood plasma substitute, ion exchange resins, saran "wool" and other new fibers, and metal-clad plastic laminates. Some of the applications receiving special mention were in the field of medicine and surgery and included acrylic hip joints, artificial hearts, intravenous tubing, and plastic casts for broken bones.

Dr. Kline reported on plastics developments in western Europe, as seen in his recent trip to attend the ISO/TC-61 meeting in Italy. Germany is again the primary plastics center, with 1952 production estimated at 195,000 tons, as compared with its wartime peak of 200,000 tons. Dr. Kline stated his belief that Germany can be expected to become the focal point for new developments in plastics within the next four to five years. The recent Dusseldorf plastics exposition showed materials that were new only in the commercial sense, and the major problem of the German plastics industry is to overcome public prejudice against plastics as inferior substitute materials. The exposition was effective in this matter since it attracted 140,000 visitors, of whom only 10,000 were foreigners. Great Britain's current annual production of plastics is about 180,000-190,000 tons, but future increases will probably not match Germany's pace, Dr. Kline said. England should continue as a center of fundamental work and development. The other western European nations are not important as regards plastics, the speaker declared. Switzerland's plastics industry is strictly an export set-up; France's consumption of plastics is only about 30,000 tons per year; and Italy has only a small, struggling plastics industry which, however, shows a progressive attitude and is building plants to produce the newer plastics.

Revise Plastic Coated Fabrics Practice

THE proposed revision of the Simplified Practice Recommendation for Vinyl- and Pyroxylin-Coated Cotton Fabrics has been approved for promulgation by the Commodity Standards Division, United States Department of Commerce, and will become effective on January 1, 1953. The material covered by this recommendation is used for automotive upholstery and trim, furniture upholstery, case coverings, footwear, luggage, sporting goods, bookbinding, and many other products.

In view of increased demand since the recommendation was first issued, the revision adds 16 styles of vinyl-coated sheetings to the original list of 20 such fabrics. In addition, the revision contains the previously listed 25 styles of pyroxylin-coated fabric. For each style of fabric the recommendation gives the width in inches and the linear yards per pound of grey fabric before coating, and the minimum width and weight per linear yard of the coated fabric. The recommendation also contains a table comparing the various styles of fabrics on the basis of weight per square yard. Copies of the revision, identified as R242-53, may be obtained from the Division's Office of Industry & Commerce, Washington 25, D. C.

SPE National Technical Conference Program and Abstracts of Papers

THE program for the ninth annual National Technical Conference of the Society of Plastics Engineers, Inc., has been announced by the committee in charge of arrangements. The Conference will be held January 21-23 in the Hotel Statler, Boston, Mass. The program follows, together with available abstracts of technical papers.

WEDNESDAY AFTERNOON, JANUARY 21

1:00 p.m. — **SPE Annual Business Meeting.**

2:00 p.m. — Session "A" — **SPE Education Forum, "Professional Training for the Plastics Industry."** Moderator will be James M. Church, Columbia University, and speakers will be Robert C. Bartlett, National Varnished Products Corp.; Charles C. Winding, Cornell University; Edward S. Bloom, E. I. du Pont de Nemours & Co., Inc.; and Bryce Maxwell, Princeton University.

2:00 p.m. — Session "B"; E. W. Vaill, Bakelite Co., presiding.

"Organic Plastic and Glass-Bonded Mica," J. Harry DuBois, Mycalex Corp. Glass bonded mica is used to gain high-temperature resistance, complete dimensional stability, low power and loss factor, high arc resistance, dimensional control, high dielectric, and minimum differential expansion with inserts. Newly developed glass-bonded synthetic mica permits elevation of temperature stability from 650 to 900° F., with good electrical properties at this high range. Experimental compounds of trifluorochloroethylene bonded synthetic mica and tetrafluoroethylene bonded mica are important materials of the future.

"Epoxy Casting Materials," Clinton Rector, National Engineering Products Co.

3:30 p.m. — Session "A" — **Synopsis of 1952 SPE Prize Paper Contest Winning Papers:** R. C. Davenport, Gregstrom Corp., presiding.

3:30 p.m. — Session "B"; E. S. Childs, Monsanto Chemical Co., presiding.

"The Metallization of Plastics," Harold Narcus, Electrochemical Industries, Inc. The advantages derived from the deposition of various metals on plastics are discussed on the basis of comparisons between plated and unplated plastics. Most experiments show a marked increase in tensile, impact, and flexural strengths for most plastics when plated. Plating also gives an appreciable increase in resistance to distortion under heat, and a decrease in water absorption if the plating completely envelopes the plastic. In addition, plating increases corrosion resistance, gives a decorative effect, and permits the utilization of certain scrap plastics. The overall success of plating on plastic depends on the proper selection of the method employed. New developments in plating, including "gas plating" and the manufacture of conductive plastics, will be discussed.

"Biaxially Oriented Polystyrene and Methyl Methacrylate," C. P. Fortner, Plax Corp.

THURSDAY MORNING, JANUARY 22

9:00 a.m. — Session "A"; John Mallary, Parker Stamp Works, presiding.

"Mold Design and Standardization," Rene Magnenat, Waterbury Cos., Inc. The "minor details" of moldmaking usually taken for granted include alinement of mold halves, ejection, and supporting and resisting pressure. Proper mold alinement depends on where the mold is under pressure before it is closed; the length of the part in the direction of mold travel; and the size and the mounting of leader pins and bushings. Ejection troubles can be eliminated by better lever control of the ejection pin areas on the molded part. The ability of the mold to support and resist pressure depends on the type of support and the design of the mold.

"Large Mold Construction," L. T. Raymond, Major Mold & Die Co. The various phases of large mold manufacturing will be discussed and illustrated by means of slides.

"Tomorrow's Roll Surface Temperature Control and New Press Heating Systems," Paul L. Geiringer, American Hyrotherm Corp. Use of high-temperature water for heating calenders and presses is increasing owing to the demand of the plastics industry for continuous production of film and coated fabrics at increasingly high roll speeds. High-temperature water permits maintenance of uniform surface temperatures, ease of temperature control, and ready variation of heating and cooling cycles. A new roll surface temperature control method is now available which is motivated by heat flow to or from the roll, rather than by the roll surface temperature itself. The heat accumulation capacity of high-temperature water is especially advantageous for press heating because it reduces fluctuations in boiler loads and in the time required for each cycle.

"Polystyrene—25 Years of Progress," A. J. Warner, Federal Telecommunication Laboratories.

9:00 a.m. — Session "B"; G. S. Laaff, Bolta Co., presiding.

"Thermoplastic Sheet Applications," Wesley S. Larson and Rolland C. Trudeau, DeBell & Richardson, Inc. The types, shapes, and applications of thermoplastics which are conventionally formed and welded are reviewed, and methods of forming and welding demonstrated. Technical details of the welding operation will be discussed. Applications of new thermoplastics and unusual uses of fabricated shapes will also be described.

"The Vacuum Forming Picture," R. L. Butzko, Noma Electric Corp., and E. B. Stratton, Jr., Industrial Radiant Heat Co.

"Plastics Engineered for Relief Map Reproduction," John J. Gurtowski, Relief Map Division, United States Army Department.

"Reinforced Polystyrene in Aircraft," David Birmingham, Colt's Mfg. Co.

THURSDAY AFTERNOON, JANUARY 22

2:00 p.m. — Session "A"; Dr. Warner presiding. Research symposium consisting of four or five papers.

2:00 p.m. — Session "B"; C. W. Kleiderer, Brilhart Plastics Co., presiding.

"Plastic Problems in Electrical Motors and Generators," Otto Wulfert, Wagner Electric Corp. There is, at present, an extended use of plastics in electric motors which is far greater than is realized by the average person. Examples of such present uses will be described. Examples will also be shown of changes from metal to plastic constructions which will demonstrate the procedure by which other such developments could take place.

"Techniques of Injection and Compression Molding Polytrifluoroethylene," C. R. Giannotta, M. W. Kellogg Co.

3:30 p.m. — Session "B" continued; A. H. Dietz, Massachusetts Institute of Technology, presiding.

"Plastics for Surgeons," Albert Lightbody, Naval Ordnance Laboratories. Illustrations of the use of plastics in the human body cover almost every part from the head to the feet and range from bones to arteries. Other uses, such as splints and casts, are also becoming common. The properties of plastics which make them of interest to the surgeon are varied and range from coloring possibility, non irritating qualities, corrosion resistance, stability in use, flexibility, and resemblance to normal bodily appearance and properties. Permanence of plastic installations in the body is still unsettled at present, and prediction of useful life of plastic parts is impossible.

"Vinyl Floor Coverings," R. K. Petry, Congoleum-Nairn, Inc.

6:30 p.m. — **Annual banquet.** After-dinner speaker will be Countess Marie Pulaski, who will describe spy activities during the last war. The banquet will be followed by an entertainment program and evening of dancing.

FRIDAY MORNING, JANUARY 23

9:00 a.m.—Session "A"; Islyn Thomas, Thomas Mfg Corp., presiding:

"Mold Castings," Gregory J. Azarian, American Brake Shoe Co. The technical phase of precision casting production will be reviewed, including types of metals, heat treatments, and polishing treatments. Cast molds are currently being used for glass reinforced polyesters, novelties, specialized industrial plastic items, and the hot hobbing of beryllium copper cavities. Iron and alloyed iron castings will be compared with regard to prices, delivery, weldability, consistency, and other factors. Future prospects for precision molds and metals will be discussed.

"Plating Molds," Arthur W. Logozzo, Nutmeg Chrome Co. Topics to be covered include plating thicknesses for various metals; hydrogen embrittlement through mold plating; what the moldmaker should know about plating; and the advantages of plating molds. A film on mold plating and polishing will be shown.

9:00 a.m.—Session "B"; Frank A. Rideout, Bakelite, presiding:

"Vinyl Compounding," M. S. Greenhalgh, General Electric Co.

"Engineering Design for Rubber Phenolics," A. P. Landall, G-E. The history and properties of rubber-phenolic compounds will be discussed. Mold design data will be stressed, including mold shrinkage, types of molds for various application, dimensional tolerances, warpage, and surface finishes. Actual applications will be shown and discussed.

10:30 a.m.—Session "A"; W. F. Oelman, Standard Molding Corp., presiding. Reports and papers will be given by the various areas of the SPE Professional Activities Committee. Area I will hold a panel discussion of **"Basic Facts on Plunger and Transfer Molding"** by the following four speakers: Sanford E. Glick, Monsanto; Mr. Vaill; Edward F. Borro, Durez Plastics & Chemicals, Inc.; and Frank J. Donohue, Monsanto. This discussion will cover the various techniques of preheating plastics, including radio frequency, infrared, steam oven, and dry oven methods. Transfer molding is carried out principally in auxiliary ram presses. Some pot-type transfer molding is still done with three-plate molds in straight compression presses. Newer transfer or plunger molds are compactly arranged in radial layouts, where possible, and with short runners. Mold design and molding factors which must be considered include gate size and shape, runner area, mold

temperature, and preheating procedure. On the material side, consideration must be given to resin type and reactivity, resin content, type and amount of filler, and moisture content.

10:30 a.m.—Session "B"; S. L. Young, C. F. Church Mfg. Co., presiding.

"Use of Plastics in Business Machines," Frank W. Reynolds, International Business Machines Corp. Plastics applications in business machines demand extreme precision, minimum dimensional change with varying temperature and humidity, and maximum wear life. IBM is now using at least 17 different plastics which are fulfilling these requirements, and these plastic applications will be described.

Series on extrusion by speakers from E. I. du Pont de Nemours & Co., Inc.: **"Some Principles of Plastics Screw Extrusion,"** W. L. Gore; **"Operating Characteristics of Extruders,"** J. F. Carley; and **"Design of a Screw for Plastics Extrusion,"** J. M. McKelvey.

FRIDAY AFTERNOON, JANUARY 23

12:00 noon—**Annual luncheon.** Featured speaker will be General G. F. Doriot, National Research & Development Corp., on the topic, **Plastics—Engineered for Tomorrow."**

2:00 p.m.—**Question and Answer Period,** with Mr. Young presiding. All Conference speakers are invited to constitute a panel to answer questions from the floor.

LADIES' PROGRAM

A separate ladies' program is planned which will include a luncheon, tour of historic Boston, theater program, fashion show, and a trip through a plastics molding plant.

Reports from SPE Sections

New York-Newark Joint Meeting

The New York Section was host to the Newark Section at a joint dinner-meeting on November 12 at the Gotham Hotel, New York, N. Y. Some 145 members and guests of the two groups heard two talks: "Methods Engineering in the Plastics Industry," by John A. Schwab, John A. Schwab & Associates; and "The Plastics Industry in Iran and the Middle East," by Sam Silberkraus, Riverdale Plastics Co.

Mr. Schwab emphasized that the engineer must consider the human side, as well as the technical aspects, of every plant management problem. Every new management system or technique must meet the following four basic specifications: (1) easy to understand; (2) quick to apply; (3) absolutely consistent; and (4) conform to the pattern of equity and fairness for everyone concerned. These four factors should be the primary consideration of management, since tools are only as good as the people who operate them.

On the subject of more direct savings by proper engineering, Mr. Schwab discussed savings in maintenance by rearranging equipment to provide accessibility; the role of statistical quality control; and better machine utilization and performance by means of predetermination studies. The speaker described his MTM (Methods Time Measurement) system for predetermination of operation times and costs. Based on breaking down all bodily motions into specific time intervals, MTM is a tool to plan and lay out new manufacturing methods before they are installed. The speaker stressed that the ability to apply MTM properly depends on prior knowledge of how the job is done.

Mr. Silberkraus stated that in the area between Israel and Pakistan the plastics industry is showing signs of activity along modern lines only in the country of Iran, and there only in the city of Teheran. Until last year this activity was confined to small, hand-operated injection molding operations with machine capacities under one ounce. Within the past year a new company has been organized in Teheran for injection and compression molding with modern techniques. This firm has five injection machines, ranging from 4-12 ounces in capacity, and one semi-automatic compression molding machine. Polystyrene is being used for injection molding to produce combs, tumblers, bowls, small toys, and similar items, largely copied from American products. The compression molding is being done with urea-melamine to produce buttons.

The speaker noted that plastics products have excellent acceptance among the public in Iran; the major selling point is the people's love of bright colors. Despite product prices that are comparable to ours and may represent 20% or more of a man's daily pay, production is insufficient to meet demand. Despite makeshift machine shop equipment, lack of facilities for heat treating anything but the smallest mold parts, and unsatisfactory mold finishing, the ingenuity of the Iranians is such that molds have been built and are operating in a suitable manner to meet their requirements.

New York Section President Bruno E. Wessinger, Wess Plastic Molds, Inc., presided over the meeting and introduced Newark President Edward W. Rown, Dillon-Beck Mfg. Co. Table favors were distributed through the courtesy of Emenee Industries, Inc., and Naugatuck Chemical Division, United States Rubber Co., and the meeting closed with a drawing for door prizes contributed by Empire Brushes, Inc., R. C. Molding Co., and Wess Plastic.

Panel on Decorative Finishing

A panel discussion on "Decorative Finishing of Thermoplastics" highlighted the November 12 joint dinner-meeting of the Chicago Section, SPE, and Midwest Chapter, SPI. Approximately 140 members and guests attended the meeting held at the North Park Hotel, Chicago, Ill. M. A. Self, Bee Chemical Co., acted as moderator of the discussion, and the panel members were Henry Kalmus, Kalmus & Associates; Sidney Melnick, G. Felsenthal & Sons; T. F. Muckenfuss, J. B. Products Co.; and L. E. Parks, Bee Chemical.

In introducing the discussion, Mr. Self said that the plastics industry has shown a continuing trend to coat its products with a wide variety of materials in order to increase sales appeal and guard against heat, moisture, abrasion, and chemicals. While restricted to relatively few items some years ago, we now find decorative coatings on a majority of plastic products. The molder's problem today is to find out what coating best suits the specific plastic involved and is most attractive to his potential customers.

The panel members discussed the major coating materials available to the plastics industry, together with the problems encountered with their use. Speaking of the proper molding of plastic parts in relation to their decorating, it was emphasized that the finish should not be an afterthought, but should be considered during initial planning of the part. Both part and mold should be designed so that the finish can be applied in the easiest and most economical manner. This point is especially true if the masked spraying, decal, or silk screen processes of decorating are to be used, since even slight warping or shrinkage of a molded part will cause a great deal of difficulty with such decorating processes.

Injection Machine Performance

A talk on "Basic Features Influencing the Performance of Injection Molding Machines" by E. Gaspar, Projectile & Engineering Co., Ltd., highlighted the October 21 dinner-meeting of the Ontario Section, SPE, at the St. Regis Hotel, Toronto, Ont., Canada.

The first portion of Mr. Gaspar's talk dealt with the characteristics of injection molding machines, and he defined and discussed the relations between shot capacity, plasticizing capacity, injection pressure, rate of injection, and mold locking force. It was suggested for general guidance that the ratio between plasticizing capacity, in pounds per hour, and shot capacity, in pounds, of any machine be not less than 100:1. The larger the machine, the more difficult it is to maintain this ratio, hence the tendency toward preplasticizing chambers. Maximum locking force theoretically determines the maximum projected area, with the weight of the molding determining its equivalent wall thickness. In practice, it has been found that on a flat disk this wall thickness and the depth of the molding finally determines the maximum wall thickness. The rate of injection is generally proportional to the shot capacity of the machine.

In discussing the quality of moldings, Mr. Gaspar described how the characteristics of the injection machine affected short moldings, flow and weld marks, shrinkage marks, craze and score marks, staining marks, and internal stresses. Thermodynamic experiments were described which apparently confirmed the theory behind the satisfactory results obtained with pin point gating. It was suggested that the core of the runner, which loses least of its heat, entered the pin point gate. The turbulence and the pressure built up in front of the gate are partly converted into heat to make up losses in the runner. After discussing the importance of proper mold temperature control for making intricate molding, the speaker concluded with a brief description of the influence of injection machine characteristics on machine output.

Tenite in Piping

The fall season of Eastern New England Section, SPE, and Boston-Providence Chapter, SPI, joint dinner-meetings began on September 25 with a meeting at the Beaconsfield Hotel, Boston, Mass. About 65 members and guests of the two groups heard John Marvin, Tennessee Eastman Co., speak on "Plastic Pipe—A Growing Field." The talk covered the use of Tenite in piping for agricultural, oil field, and industrial applications and was illustrated by a series of colored films on Australia, which showed how the Tenite is being used to pipe water. An additional film illustrated the use of Tenite piping in the oil fields. In the question-and-answer period following the talk, Mr. Marvin also discussed the use of other plastics for piping, including modified styrenes, flexible and rigid vinyls, polyethylene, and glass-filled polyesters. In the brief business session preceding the talk, James F. Lang, Bakelite Co. and New England Section president, announced that the Section now has more than 100 members.

(Continued on page 384)

Scientific and Technical Activities

Goodyear Medal Award and Fine Program Feature Rubber Division, A. C. S., Buffalo Meeting

THE Division of Rubber Chemistry of the American Chemical Society held its sixty-first meeting in Buffalo, N. Y., October 29-31, at the Hotel Statler. A fine program of papers, the award of the Division's Goodyear Medal to H. E. Simmons, former president of the University of Akron, interesting plant trips, a luncheon-meeting of the Division's 25-Year Club, and many other features combined to make this meeting a memorable occasion. Registration was 806 members and guests.

The 25-Year Club luncheon-meeting was held on Wednesday, October 29, and the first technical session took place on the afternoon of the same day. The Goodyear Medal Award Address was made by Dr. Simmons at the second technical session on Thursday morning, October 30. Those in attendance had a choice of plants to visit on Thursday afternoon as follows: Carborundum Co., Coated Products Division; Niagara Mohawk Power Corp.; Socony-Vacuum Oil, Buffalo Refinery; Sylvania Electric Products, Inc., Radio & Television Division; and U. S. Rubber Reclaiming Co., Plant No. 2.

The cocktail party given by the suppliers to the industry was held from 5:00 to 7:00 p.m. on Thursday, followed by the annual banquet of the Division at which the Goodyear Medal Award was made to Dr. Simmons. Two technical sessions on Friday morning and afternoon, October 31, completed the program. The business meeting of the Division, at which the election of Division officers and directors was announced, was held Friday morning.

Waldo L. Semon, of B. F. Goodrich Co. Research Center and chairman of the Division, presided at the technical sessions and the Division banquet. Both at the first technical session and at the Division banquet he paid tribute to the hard work of the local committee on arrangements under J. G. Augenstein, U. S. Rubber Reclaiming, with E. C. Siverson, Buffalo Weaving & Belting Co., as vice chairman, which made the meeting arrangements so satisfactory.

25-Year Club Meeting

The 25-year Club meeting on Wednesday noon had H. F. VanValkenburgh, Dunlop Tire & Rubber Co., as chairman and attracted the usual 125-150 attendance. A moment of silence was observed in memory of recently deceased members including R. M. Graham, General Tire & Rubber Co.; W. J. McCauley, H. Muehlstein & Co.; W. Higgins, United Carbon Co.; and R. Morath, Naugatuck Chemical Division., United States Rubber Co.

New members were next introduced. A partial, although not complete, list of new members includes E. H. Damon, Phillips Chemical Co.; Henry Peters, Bell Telephone Laboratories; R. K. Opper, Naugatuck Chemical Division, C. W. Sweitzer, and H. C. Steffen, Columbian Carbon Co.; and J. W. Snyder, Binney & Smith Co.

A roll call of the members with longest period of service in the rubber industry established W. E. Kavenagh, Goodyear Tire & Rubber Co., as the winner with more than 50 years' service. In presenting a memento to Mr. Kavenagh in honor of the occasion, A. A. Somerville, R. T. Vanderbilt Co., mentioned briefly some of the accomplishments of the winner, including his past service as mayor of Windsor, Vt.

Mr. Kavenagh was appointed chairman for the next luncheon-meeting of the 25-Year Club to be held in connection with the Rubber Division meeting in Boston, Mass., in May, 1953.

(*Top*) E. R. Bridgwater Describes the "Accomplishments of the Medalist" Dr. Simmons (*Left*) Receives the Goodyear Medal from Dr. Semon (*Bottom*) Dr. Simmons Making His Acceptance Speech

Goodyear Medal Award Address

Dr. Simmons made his Goodyear Medal Award Address on Thursday morning. His subject was "Out of the Past" and included incidents he considered indicative of the growing pains the rubber industry experienced from 1910 to 1930 when Dr. Simmons was actively engaged in the field of industrial rubber technology. He also described the early days of the Rubber Division when the only subject possible of discussion at its meetings was the chemical anaylsis of compounded stock. It was not until after World War I, he said, that the character of the programs changed, and the atmosphere was cleared as far as revealing the results of research on rubber.

Progress in rubber technology involving the use of carbon black in place of zinc oxide as a reinforcing agent for tires and the controversy that developed between various tire manufacturers between the relative merits of the "white" and "black" tire, were described.

Dr. Simmons paid tribute to the Division's publication, *Rubber Chemistry and Technology*, which was started in 1928 and which, he said, "could have been a complete failure in a short time had it not been for the fact that the editorship was in the care of such competent people. . . . The entire rubber industry owes a great debt to those faithful people who over the years have made this publication a definite contribution to the rubber technologists and the rubber industry," he added.

The medalist also said that it would be foolish to say that rubber technology won World War II; but it would be safe to say that without the achievements of the rubber technologists we would have lost the war. With reference to the industry committees of the War Production Board during World War II, it was emphasized that a spirit of real cooperation exists when the safety of the American system of free enterprise is at stake, and that was why all the know-how of the industry was made available to all during that period.

Dr. Simmons concluded by saying that if there was any justification for honoring him with the Goodyear Medal, it must have been because of the part he played in making it possible for young men to interest themselves in the rubber industry. He said he was proud of the contributions these young men have made to the development of the industry and that his greatest satisfaction came from his experiences in the classroom and the associations formed there.

The Technical Sessions

Abstracts of the 25 papers given before the technical sessions appeared in our October issue, pages 86-90, but some further comments on some of these papers now can be made.

GR-S extended with rosin-type acids, as described in the paper by L. H. Howland and others of Naugatuck Chemical, was indicated as having greater abrasion re-

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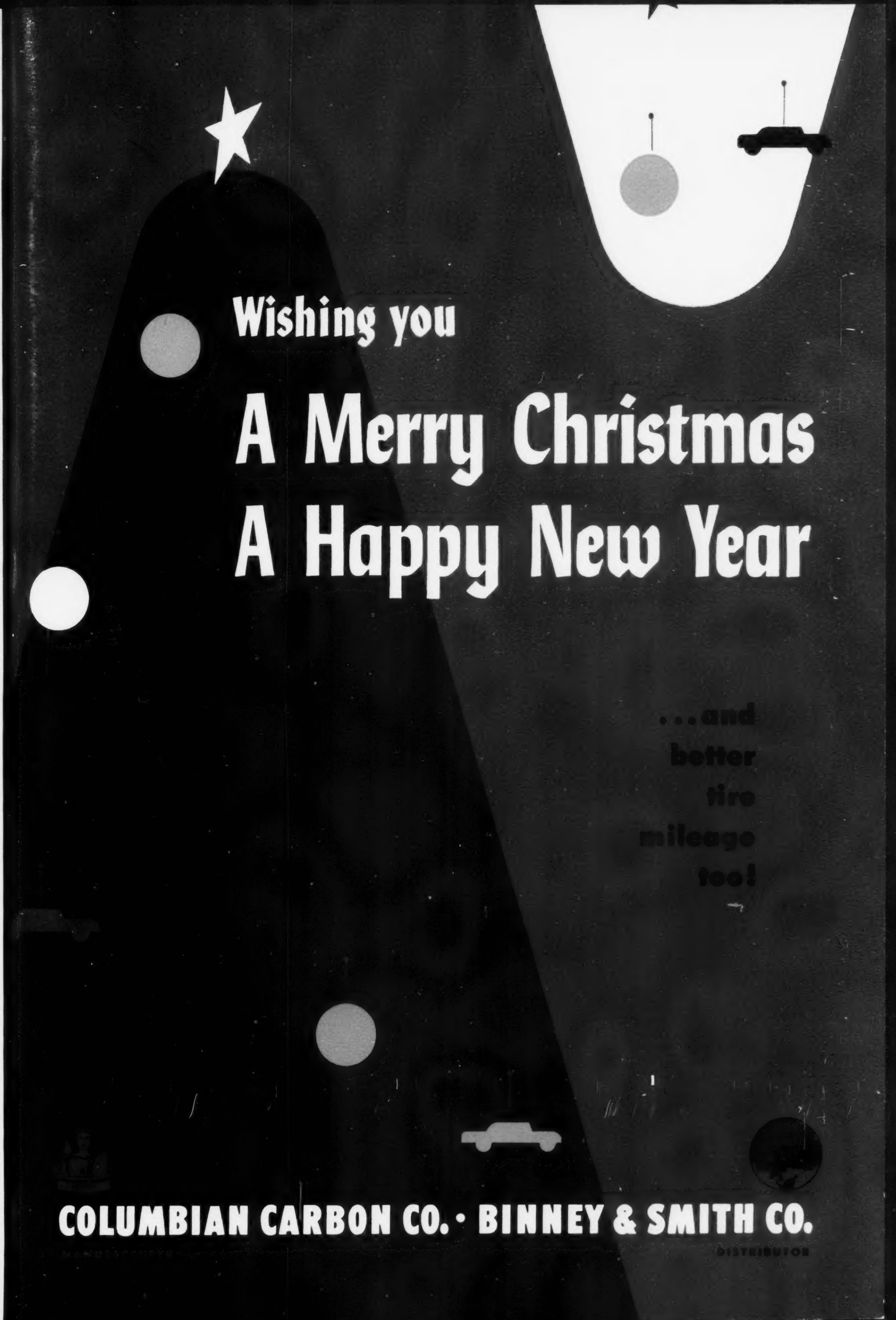
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sistance than LTP GR-S and also to have good resistance to heat, flex cracking, and aging, when tested in the laboratory. Preliminary road tests for tires made with the new rubber appear to confirm the laboratory results. Factory processing is also easier with the rosin extended GR-S.

In examining the effect of chemical composition of rubber processing oils on the resulting oil extended GR-S, K. V. Weinstock, General Tire, R. B. Storey, Polymer Corp., Ltd., and J. S. Sheely, Sun Oil., stated that with oils ranging from relatively aromatic to relatively paraffinic, they could find no very great differences in the processing of the stocks or in the properties of the vulcanizates, including road tests of the tires.

In a similar study W. K. Taft, June Duke, and others at the Government Evaluation Laboratories, University of Akron, reported that the method of processing in factory may have to be adjusted for the type of oil used in preparing oil extended GR-S. A greater effect on breakdown of the polymer was attributed to nitrogen bases found in the aromatic oils.

The new GR-S polymer synthesized at 122° F. that has properties as good as LTP GR-S polymerized at 41° F., because of initiation with diazotized p-nitroaniline (Nitrazole CF), was described by J. M. Willis and others of the Firestone Tire & Rubber Co. A deficiency in cut-growth resistance was the only disadvantage shown for the Nitrazole CF polymer, but this property could be improved, it was said. Use of the new polymerization system at temperatures lower than 122° F. lengthened the time, but further improvements were hoped for here also.

The very interesting apparatus for the study of electrical contact potentials produced during Banbury mixing was explained R. S. Havenhill, of St. Joseph Lead Co. It was emphasized that the more positive the charge on ingredients such as zinc oxide when mixed with the negatively charged rubber, the more rapid the incorporation, the better the dispersion, etc., and this fact could be detected and demonstrated with the new apparatus.

The use of activated carbon, made from a waste product of the wood pulping process, may solve the problem of staining often associated with the use of reclaimed rubber in the manufacture of white and light-colored rubber products, according to John J. Keilen and Walter K. Dougherty, West Virginia Pulp & Paper Co.

Improved ozone resistance of blends of GR-S and Hypalon S-2 were reported by J. Remington, Robert T. Currin, and others, of E. I. du Pont de Nemours & Co., Inc. A 75-25 blend showed no ozone failure when exposed to a concentration 400 times as great as that usually found in the atmosphere, it was said. When increased stress was placed on the blend, and it was subjected to elevated temperatures, somewhat more than 25 parts of Hypalon S-2 were required to prevent ozone failure. Under varying conditions of stress and temperature, blends of varying composition are required.

Some unusually strong, heat-resistant and cold-resistant silicone rubber compounds obtained by the use of Du Pont Silicia GS119S were reported by F. L. Kilbourne, Jr., and others of the Connecticut Hard Rubber Co., and Juan Montermoso, Office of the Quartermaster General. Oxides of zinc, aluminum, or titanium were also found to have useful properties in silicone rubber. The authors stated that they felt that the future growth of the silicone elastomer field is assured, and

Fabian Bachrach

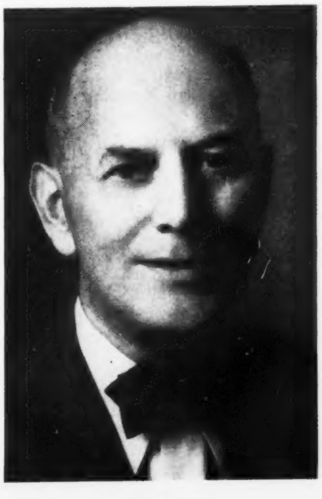
J. C. Walton

silicone rubber is destined to take its place among the special-purpose rubbers such as neoprene, butadiene-acrylonitrile copolymer, and butyl rubber.

There was considerable interest in the paper on "Purchase and Inspection Standards for Dry Natural Rubber," by W. J. Sears, of The Rubber Manufacturers Association, Inc. This paper was a review of some of the factors being covered in the RMA Seminars on Natural Rubber being given in important rubber consuming centers throughout the country. Mr. Sears emphasized that the RMA visual inspection procedure must be more rigidly adhered to, after which technical specifications and the increased demand for technically classified rubber would follow.

A special laboratory apparatus for measuring the friction of tread compounds on ice in which the experimental variables can be closely controlled, was described by C. S. Wilkinson, Jr., of Goodyear. Temperature was found to have the greatest influence on the friction of tread compounds on ice, and it was also learned that several variables in the samples themselves affected the friction. The type and the hardness of the rubber were of considerable importance.

A more rapid method of measuring the permeability of different elastomers to different gases by use of radioactive carbon was explained by A. D. Kirshenbaum and A. G. Streng, of Temple University, and W. B. Dunlap, Jr., Lee Rubber & Tire Corp. The solubility of a gas in the rubber can be determined simultaneously.



S. G. Byam

Radioactive sulfur was used in a study of mercaptobenzothiazole vulcanization by I. Auerbach, of Goodyear.

The Division Business Meeting

Chairman Semon first asked the members to stand for a moment of silence in memory of two members of the Division whose deaths occurred during the past several months: W. S. Calcott, of du Pont, and W. Higgins.

It was then explained that the Division would hold three meetings in 1953. The first meeting is scheduled for Los Angeles, Calif., March 18 to 20; the second, in Boston, Mass., May 27 to 29; and the third, in Chicago, Ill., September 9 to 11. The deadline for abstracts of papers for the Los Angeles meeting is January 2, 1953, for the Boston meeting, April 16, and for the Chicago meeting, August 5. Abstracts of approximately 200 words should be sent to C. R. Haynes, Division secretary, % Binney & Smith Co., 41 E. 42nd St., New York, N. Y.

The Division is scheduled to hold two meetings in 1954, the first in Louisville, Ky., April 14 to 16, and the second in New York, N. Y., in mid-September.

Two amendments to the Division by-laws were approved by the members. One amendment granted voting privileges in the executive committee of the Division to councillors of the Society from the Division. The other amendment increased the term of the councillors from two to three years.

J. C. Walton, Boston Woven Hose & Rubber Co., chairman of the finance committee, reported that the Division was solvent in spite of steadily increasing expenses. The cost of the Division's "Rubber Bibliography" publication was expected to increase about $1,000 a year during the next three years, it was said. An appropriation to cover this increased cost has been made. Each issue of the "Rubber Bibliography" will now be published to cover three years instead of two.

To meet this and other increased costs of the Division, yearly dues will now be $4 a year for members and $6.50 a year for assoociates. Company memberships will cost $7.50.

The A. C. S. monograph, "Synthetic Rubber," prepared by the Division, is now in the hands of the publisher, but owing to publishing difficulties, will require nine months to print.

J. J. Hoesly, Goodyear, chairman of the membership committee, reported an increase in members from 2,810 in October, 1951, to 3,294 on October 31, 1952.

The report of R. A. Emmett, Binney & Smith, chairman of the tellers' committee, on new officers and directors of the Division resulting from recent balloting was as follows: chairman, Seward G. Byam, du Pont; vice chairman, Mr. Walton; secretary, Mr. Haynes; treasurer, Amos W. Oakleaf, Phillips Chemical Co. Directors from the areas of certain local rubber groups elected for a two-year term were: Akron, O. C. A. Ritchie, B. F. Goodrich Co.; Boston, J. L. Haas, Hodgman Rubber Co.; Buffalo, C. O. Miserentino, Dunlop Tire & Rubber Co.; Chicago, Ill., A. E. Laurence, Phillips Chemical: Fort Wayne, Ind., C. S. Yoran, Brown Rubber Co.; Los Angeles, G. W. Miller, W. J. Voit Rubber Corp.; and New York, G. N. Vacca, Bell Labs.

The new Division chairman, Mr. Byam, took the floor to pay tribute to the work during the year of the retiring chairman, Dr. Semon. He also took the occasion to urge a good attendance for the three Division meetings in 1953 and ample contribution of paper by the members for these meetings.

The Division Banquet

The banquet of the Rubber Division at the Hotel Statler on the evening of October 30 was preceded by the Suppliers' Cooperative Cocktail Party in the Georgian and Chinese Rooms of the hotel. Jean Nesbit, U. S. Rubber Reclaiming, was in charge of the arrangements for this very pleasant interlude.

The banquet itself was featured by the presentation of the Goodyear Medal to Dr. Simmons. Prior to these ceremonies, however, Dr. Semon welcomed the members and guests of the Division and introduced to them those seated at the head table, including Harry L. Fisher, well-known member of the Division, a candidate this year for president-elect of the Society, and Walter J. Murphy, editor of *Industrial and Engineering Chemistry*, and Society representative at the Division banquet. In keeping with current emphasis on presidential candidates and elections, Dr. Semon introduced Dr. Fisher as "the next president of the American Chemical Society" and urged the support of Dr. Fisher's candidacy by members of the Division.

E. R. Bridgwater, du Pont, discussed the "Accomplishments of the Medalist," prior to the actual award of the Goodyear Medal to Dr. Simmons. Bridgwater first paid tribute to Dr. Simmons as a man who had trained a large number of the people who run the rubber industry in the United States and many other parts of the world. The medalist's early training at the University of Akron (then Buchtel College) and the University of Pennsylvania, his return to the University of Akron as an assistant professor of chemistry in 1910, his elevation to head of the chemistry department in 1912, and finally to the presidency of the University in 1933, were described.

Mr. Bridgwater referred to the work of Dr. Simmons in 1942 and 1943 when he headed the WPB Committee on Education on Synthetic Rubber as having much to do with the smooth transition of the consuming industry from the use of natural to synthetic rubber

The medalist was cited for his outstanding accomplishments in the fields of education, science, and public service, and it was said that in awarding the Goodyear Medal to Dr. Simmons the Division itself was being honored.

The banquet program was concluded with several excellent variety acts.

SAE-ASTM Committee on Automotive Rubber

MEETING NO. 61 of the SAE-ASTM Technical Committee on Automotive Rubber was held at the Rackham Memorial Bldg., Detroit, Mich., September 17, with 36 persons attending. Committee Chairman H. A. Winkelmann, Dryden Rubber Division, Sheller Mfg. Corp., presided over the meeting, assisted by Secretary J. T. O'Reilly, Ford Motor Co.

General Meeting Notes

Reports were presented by the various committee sections, as given below. It was announced that recent letter ballots of the committee have given approval to the recommended revision to the SAE Standard for V-Belts and Pulleys, and the proposed revision to ASTM D735 and SAE-10R.

E. H. Smith, Bendix Aviation Corp., reported on his investigation of the advisability of setting up a section on "Trim Flash," and it was suggested that he coordinate with the O-ring group, Section XI, which is considering flash on O-rings.

Dr. Winkelmann announced the appointment of a nominating committee to select a slate of office candidates before the next meeting. This committee is headed by W. J. McCortney, Chrysler Corp., and includes S. R. Doner, Manhattan Rubber Division, Raybestos-Manhattan Corp., E. G. Kimmich, Goodyear Tire & Rubber Co., and C. E. Zwahl, Chevrolet Division, General Motors Corp.

The next meeting of the committee was scheduled for December 12 at the Rackham Memorial Bldg.; while the advisory committee meets on the same evening at the Park-Sheraton Hotel in Detroit. To avoid a concentration of section meetings at that time, it was agreed that the sections would hold individual meetings on November 12 and 13 at the Rackham Memorial Bldg.

Section Reports

Section I—Vibration Insulators. J. F. McWhorter, Ohio Rubber Co., chairman. Editorial revisions of the motor mount test method have been approved. Load deflection and resiliency specifications suggested by Section XII were reviewed, and a proposed round-robin test program will be started after samples have been obtained and engine mounts given dynamic property and life tests. The Section plans to emphasize practical work in the future, rather than academic aspects. A report on road service testing will be discussed at the next meeting.

Section III—Hose. C. P. Mullen, Gates Rubber Co. Work is under way on specifications for automotive fuel and oil hose to supersede Army Specification 20-134, and for automotive wire braided hose to supersede Army Specification 20-143. Interested persons are advised to write Paul Hopkins, chairman of Section III-C.

Section IV—Classification and Specifications of Automotive Rubber Compounds. J. J. Allen, Firestone Industrial Products Co., chairman. Letter ballots will be sent out on the following items: (1) proposed addition of a moisture absorption requirement to ASTM D1056-51T; (2) revision of D735-52T to exclude specifically wire and cable; and (3) proposed specification on non-rigid plastics.

Section VI—V-Belts. Mr. Kimmich, chairman. The committee has approved the proposed revision to the SAE Standard for V-Belts and Pulleys, and this standard is expected to be used by the Munitions Board in standardizing the more than 700 different engines which are now being used in Korea.

Section IX—Hydraulic Brake Cups. Mr. Doner, chairman. Ford has suggested that the specification on heavy-duty cups be extended to include master cylinder cups. This suggestion will be discussed at the Section's next meeting.

Section X—Gaskets. J. M. Clark, Packard Motor Car Co., chairman. New beater mixed fiber compositions are being offered for inclusion in D1170-51T. A group has been appointed to suggest more descriptive definitions of the various fiber and filler classifications. A round-robin test has been established to correlate Mullen and tensile tests. A report will be made on applicable methods for testing stress relaxation on gaskets. A round-robin test group has been named to evaluate new gasketing submitted for approval.

Section XI—Oil Seals. Mr. O'Reilly, chairman. A proposed revision on the testing of oil seals will be sent to Section letter ballot.

Section XII—Manual on Laboratory Procedures. J. C. Dudley, Chrysler Corp., chairman. In Mr. Dudley's absence, Mr. Doner declared that this Section has nothing to report at present.

Garvey at Los Angeles

THE Los Angeles Rubber Group, Inc., held a regular meeting on November 5 at the Hotel Statler, Los Angeles, Calif. One hundred members and guests attended the afternoon technical session, which featured a paper on "Accelerator Compounding: Heat History and Compounding" by B. S. Garvey, Jr., Sharples Chemicals Inc., written in collaboration with D. W. Yochum and C. A. Morschauser.

Dr. Garvey's talk was devoted to certain phases of compounding that are related to scorch time and cure time. Evidence was presented to indicate that both initial (or maximum) scorch time and vulcanization time are characteristics of a compound and depend primarily on the accelerator, but also to some extent on the sulfur ratio, pigments, etc. The initial scorch time may be partly or completely used up by the heat history of processing, (measured here by time on a hot mill), so that for different batches the scorch time is variable and depends on heat history. On the other hand, vulcanization time is constant and is independent of the scorch time of the particular batch.

Since cure time is the sum of the variable scorch time and the constant vulcanization time, it also varies with the heat history of the batch, Dr. Garvey said. This point may explain many apparently mysterious variations in factory cures. Different accelerators vary in initial scorch time, in vulcanization time, and in the ratio of both. If processing heat history can be adequately controlled, it is possible to process stocks at curing temperatures or even higher, the speaker concluded.

The technical session was followed by a cocktail hour and dinner-meeting sponsored by Goodyear Tire & Rubber Co. and attended by 310 members and guests of the Group. R. W. Raney, Goodyear plant manager, presided over the dinner-meeting and introduced the guest speakers, Jesse Mortensen and Jesse Hill, the track and football coaches, respectively, of the University of Southern California. Following the talks there was a showing of a color film on the summer Olympic Games held in Finland. The meeting closed with a drawing for door and raffle prizes contributed by Goodyear and won by H. A. Creighton, United States Rubber Co.; A. L. Pickard, Braun Corp.; J. R. Mer-

gell, Latex Products Co.; John Hoerger, A. Schrader's Son Division, Scoville Mfg. Co.; C. E. Huxley, Western Insulated Wire Co.; Dick Wells and R. L. Bowen, both of Firestone Tire & Rubber Co.; Larry Fuller, Patterson-Ballagh Corp.; and B. E. Biheller, H. Muehlstein & Co., Inc.

GR-I in Coated Cartons

BACK in October 12, 1951, the Sales Division, Office of Synthetic Rubber, RFC, announced that GR-I-15, -17, and -18 would also be packaged in coated cartons since certain purchasers were not able to handle film-wrapped rubber. These cartonned polymers were designated by the suffix "-CC" to permit ordering them without confusion.

In a memorandum dated October 30, 1952, the Division announced that standard GR-I will also be available in either film packages or coated cartons. Customers desiring this type of butyl in coated cartons should specify GR-I-CC on their purchase orders. The complete list of butyl rubbers available starting during November includes GR-I, GR-I-CC, GR-I-15, GR-I-15-CC, GR-I-16, GR-I-17, GR-I-17-CC, GR-I-18, GR-I-18-CC, GR-I-25, GR-I-40, and GR-I-R-21.

GR-I in Export Boxes

Under memo of November 18, the OSR Sales Division announced that GR-I is now available in special export boxes upon payment of a premium. Most domestic GR-I is shipped film wrapped in a sleeve-type box. The export version of this box is made with waterproof liners and adhesives. Film wrapped GR-I in this export carton can be purchased for the domestic price (20.75¢ a pound plus the Uniform Freight Charge) plus a premium of 0.3¢ a pound.

A small percentage of domestic GR-I is also shipped without film in coated cartons. The export version of this box is also made with waterproof liners and adhesives and is sold at a premium of 0.5¢ a pound over the domestic GR-I price. Orders for GR-I packed in either of these two export cartons should be submitted at least 30 days in advance of the desired shipping date. For export packages on short-order notices, outer supporting wooden crates are available. GR-I in domestic cartons can be packaged in these crates for extra support, and such shipments are sold at a premium of 0.8¢ a pound over the domestic price.

Mathematics Service

MATHEMATICAL COMPUTING SERVICE, 105 Court St., Brooklyn 2, N. Y., offers a service to industry and universities in the performing of engineering calculations of a high degree of complexity, and the treatment of related mathematical problems in the field of chemical engineering. An important function of the Service is the mathematical formulation and complete solution of a problem from given physical data. The staff consists of consultants holding doctorate degrees who are qualified to treat problems in applied mathematics related to the physical sciences.

Coated Fabric Packing Compound

A NEW specification, MIL-P-2829A, was recently issued by the Bureau of Ships, Navy Department, Washington 25, D. C., to cover a coated fabric packing which is used as a joint sealer and as a faying material. This specification has a qualification requirement that manufacturers submit specimens for test and approval before their products are acceptable for procurement. A formulation to cover this material has been developed as part of the Bureau's Rubber Formulary and is available to interested firms upon request.

Investigate Rubber Staining in Wires

A LABORATORY investigation to determine the major causes of discoloration of light-colored rubber covers on building wire and cable was recently completed by Solar Compounds Corp., Linden, N. J. Discoloration may occur during either processing or storage and shows up on the wire surface as yellow to brown stains or gray to black spots. While discoloration can occur at any time, it is more likely to take place during the summer months.

In the investigation it was decided to use canvas strips rather than short lengths of wire because the former provided larger areas for studying the various combinations of saturating compounds, finishing compounds, paints, and wax dressings. Test specimens were prepared by saturating the canvas and applying a thin coat of finish by means of a doctor blade. Wax top dressing was applied over the paint, and the completed specimens were placed in an air oven at 120° F. Visual observations and comparisons of exposed and unexposed specimens were made after 13, 24, 72, 96, and 168 hours.

As a result of these tests, the following data were learned regarding discoloration during storage:

(1) Effect of saturating compounds. Certain types of asphalt bases used in the manufacture of saturants were found to cause discoloration. This can be controlled by the proper selection of the asphalt base. It was also found that some waxes, particularly low melting point, poorly refined types, are a decided factor in causing discoloration when used in the saturating compounds.

(2) Effect of finishing compounds. None of the finishing compounds examined proved to be a major cause of discoloration.

(3) Effect of paints. Properly formulated paints do not seem to discolor, but they act as a background for the discoloration.

(4) Effect of wax top dressings. Waxes used as top dressings and anti-sticks were found to be the major cause of discoloration. High free oil content and low melting point types of wax cause the most trouble.

Discoloration during processing was found to result from (1) excess saturant left in the braid; (2) poor coverage of saturant by the finishing compounds; (3) active solvent constituents in the paint; (4) excessive application temperature of the wax top dressing; and (5) improper cooling of the wire before placing it on the take-off reel.

According to E. Paschall, Solar president, "The investigation data can serve only as general information for wire companies. There is no hard and fast rule which covers all cases."

Talks on Butyl

THREE talks on the general topic of "Butyl—Its History, Manufacture, and Applications" featured the fall meeting of the Philadelphia Rubber Group, held November 14 at the Poor Richard Club, Philadelphia, Pa. Some 153 members and guests attended the meeting, which included a cocktail hour and dinner. The guest speakers were W. J. Sparks and R. M. Thomas, both of Standard Oil Development Co.; and A. N. Iknayan, United States Rubber Co.

Dr. Sparks spoke on the history of butyl, noting that it was announced in 1940 as ready for trial use, and became the major rubber for inner tubes within the next few years. The speaker mentioned that although the Russians did some of the original work on this polymer, it is one of the few things to which they have not laid claim as inventors.

Mr. Thomas discussed the manufacture of butyl, illustrating his talk with a demonstration of isobutylene polymerization to show the rapidity of the reaction. After reviewing the manufacturing process and methods of recovering the unreacted gases, he pointed out that one billion pounds of the polymer have been made to date.

Dr. Iknayan, the final speaker, discussed the compounding and processing problems that had to be overcome with the adoption of butyl for inner tubes.

Synthetic Yarns Discussed

THE November 20 dinner-meeting of the Quebec Rubber & Plastics Group featured a talk on "New Yarns for Old" by Douglas Walkington, Canadian Industries, Ltd. The meeting took place at the Queen's Hotel, Montreal, P.Q., Canada.

Mr. Walkington gave a very interesting talk on the history, development, and current status of both natural and synthetic yarns. In discussing the synthetic fibers, he emphasized that they all have high tensile strength, equivalent wet and dry strengths, dimensional stability, quick drying rates, and are heat setting, but differ markedly in other properties. They may be classed as moisture-insensitive fibers, however, and in this characteristic they differ from natural fibers. The speaker described the properties and the applications of the synthetic fibers, both alone and in blends, and noted the dangers of misapplication. The talk also covered developments in the older fibers, such as shrinkproof and mothproof wool, non-flammable cotton, metallized cotton, wrinkle resistant rayon, and others.

R. I. Club Hears Litzler

THE November 20 dinner-meeting of the Rhode Island Rubber Club featured a talk on "The Surface Coating and Impregnation of Fabric" by C. A. Litzler, Industrial Ovens, Inc. The meeting, held at the Metacomet Golf Club, attracted 148 members and guests. Using slides to illus-

trate his talk, Mr. Litzler discussed spreading, coating, and impregnating equipment, as well as accessory machinery for tensioning, take-up, stretch control, solvent evaporation, etc.

New officers of the group were elected during the business session preceding the talk, as follows: chairman, Roy G. Volkman, United States Rubber Co.; vice chairman, Francis W. Burger, Kleistone Rubber Co.; and secretary-treasurer, Urbain Malo, Crescent Co., Inc. Directors of the group are: (three years) Harry Ebert, Firestone Tire & Rubber Co., and Walter Blecharczyk, Davol Rubber Co.; (two years) W. K. Priestley, R. S. Rubber, and H. W. Day, E. I. du Pont de Nemours & Co., Inc.; and (one year) Gilbert Enser, Collyer Insulated Wire Co., and Ray Szulik, Acushnet Process Co. Retiring Chairman C. Leigh Kingsford, U. S. Rubber, was presented with a leather briefcase as a token of appreciation by the group.

Give Talks on Butyl

THE fall meeting of the Connecticut Rubber Group took place November 13 at Rapp's Restaurant, Shelton, Conn., with 150 members and guests present. The technical session featured talks on "Recent Compounding Developments and Applications of Butyl Rubber" by Robert M. Thomas and Donald J. Buckeley, both of Enjay Corp. The talks were similar to those given by Mr. Thomas and W. J. Sparks before the November 14 meeting of the Philadelphia Rubber Group, abstracted elsewhere in this issue. Besides the speakers, there was also a demonstration of the laboratory method for making butyl by Wynne Smith, of Enjay.

Following the technical session G. R. Sprague, Sponge Rubber Products Co. and Group chairman, announced the slate of candidates for officers and directors for the coming year, as follows: chairman, F. J. Rooney, General Electric Co.; vice chairman, Russell Paquette, Duro-Gloss Rubber Co., and G. A. Di Norscia, Sponge Rubber; secretary, T. Zimmerman, R. T. Vanderbilt Co., and J. Boyle, Armstrong Rubber Co.; treasurer, Ward Fisher, Armstrong Rubber, and George D'Olier, Raybestos-Manhattan, Inc.; and directors, A. Simons, H. O. Canfield Rubber Co., A. Schorr, Vanderbilt, R. P. Painter, Marbon Corp., and A. Panagrossi, Connecticut Hard Rubber Co. The remainder of the evening was devoted to a Thanksgiving party.

Specialty Rubbers

A PAPER on "A Survey of Modern Specialty Rubbers" was presented by James D. D'Ianni, Goodyear Tire & Rubber Co., at the November 18 meeting of the Elastomer & Plastics Group, Northeastern Section, A. C. S. Some 55 members and guests attended the meeting, held at Massachusetts Institute of Technology, Cambridge.

Dr. D'Ianni discussed the outstanding characteristics of a number of special rubbers currently available, including butyl, Vistanex, neoprene, nitrile, Thiokol, silicone, acrylic, diisocyanate, and others. It was pointed out that although the molecular structure of many of these polymers bears little resemblance to that of natural rubber or GR-S, the former are satisfactorily employed for many applications in which they are superior to these all-purpose polymers. While the goal still remains of preparing a synthetic rubber identical with natural rubber at least in microstructural aspects, there is now available a profusion of tailor-made polymers to meet specific needs. In evaluating the merits of these synthetics against natural rubber, it is easy to conclude that the sum of the parts more than equals the whole, the speaker said.

SPE Sections

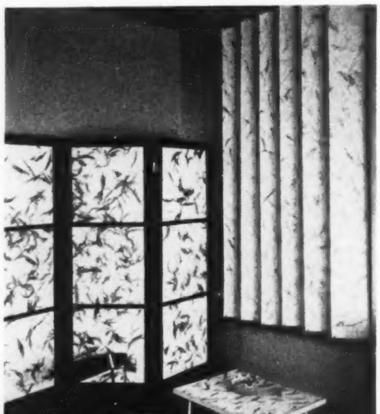
(Continued from page 377)

Elliott Speaks at Buffalo

The October 17 dinner-meeting of the Buffalo Section, SPE, held at the Hotel Sheraton, Buffalo, N. Y., featured a talk on "High Impact Styrenes and Copolymers" by Paul M. Elliott, Naugatuck Chemical Division, United States Rubber Co. Dr. Elliott discussed recent developments in these materials which have improved impact, chemical, and heat resistance. Properties of the new Kralastic styrene copolymer resins were also described. In the discussion period following the talk Dr. Elliott also answered questions on the characteristics of his company's Vibrin polyester resins.

New Polyplastex Laminates

NEW materials and designs that incorporate colorful fabrics, grass, yarns, botanical matter, and other natural materials with durable Vinylite plastics and resins were shown by Polyplastex United, Inc., at an October 29 press preview of its new showrooms at 441 Madison Ave., New York, N. Y. Three types of materials were featured at the showing: Polyplastex Synskyn, a decorative blending of Vinylite resins and Fiberglas; Panlam, a rigid laminate consisting of two Vinylite plastic rigid sheets with fabric or other decorative material locked in between; and Panflex, a similar sandwich-type construction made of flexible Vinylite film and sheeting.



New Polyplastic Developments Permit Design Matching with Panlam Rigid Laminates for Screens, Blinds, and Table Tops, and Panflex Flexible Laminates for Upholstery and Other Coverings

The new Panflex materials will have their first showing to the trade this fall, as will many of the new design in Panlam and Synskyn. Numerous product applications for the materials and designs were shown in the showroom. Panlam was displayed principally as textured upholstery for chairs and furniture, as well as wall covering, paneling, and table tops. Other applications are expected to include luggage, brief cases, book covers, handbags, and other products. According to H. W. E. Reiley, Polyplastex president, design possibilities are practically limitless. Duplication of design in flexible and rigid laminates now makes it possible to upholster chairs with the same design appearing on screens, wall covering, or lampshades.

The Panflex laminates have a clear top layer of plastic that penetrates in and around the design material and is securely bonded to the bottom opaque or translucent Vinylite layer. Locked between the two layers are open weave fabric ranging from linen to burlap, grass, colored yarn in random patterns, Fiberglas, and heather to give distinct design. Between layers of the newly designed Panlam rigid laminate are such materials as pastel tinted leaves, colorful ostrich feathers, fabrics, grass, heather, etc. Both layers of Panlam may be either clear or translucent, and the material is used to best advantage in decorative screens, room dividers, vertical blinds, and lampshades. Both Panflex and Panlam are available in laminate thicknesses from 0.015-0.250-inch and in standard sheet sizes of 48 by 72 and 38 by 62 inches.

New patterns were also shown in translucent Polyplastex Synskyn, widely used for lampshades. The latest designs feature rough, sand textured surfaces in mottled colors and random patterns, and painted patterns with vivid slashes of color and large motifs. Synskyn is available in a standard thickness of 0.020-inch and continuous sheeting 42 inches wide. Also shown were window draperies made by thoroughly saturating open-weave yard goods with Vinylite resins, and decorated by painted patterns.

In French Plastics Firm

Monsanto Chemical Co., St. Louis, Mo., on November 21 announced formation of a new jointly owned French company in association with Compagnies Reunies des Glaces & Verres Speciaux de la France.

The new company, La Societe Monsanto-Boussois, S. A., will produce plastic materials, including polystyrene molding compounds which will be manufactured under processes owned by Monsanto and developed by its plastics division at Springfield, Mass.

Engineering will start immediately, and construction will follow at Wingles, near Lens, France, the site of an existing glass manufacturing plant owned by the French parent company. Operations will start prior to mid-1953.

NEWS of the MONTH

More details on the recent industry recommendations for the disposal of the government owned synthetic rubber plants indicate they were prepared under a Presidential directive to follow the principles of the 1950 Steelman report. The new Congress will probably see Senator J. Bricker of Ohio and Congressman Paul Shafer of Michigan heading up the committees dealing with rubber legislation. A decision in 1953 to dispose of the plants to private industry may represent the last opportunity for such disposal. If agreement cannot be reached on terms, the plants may remain permanently in Government hands.

The General Services Administration has announced a natural rubber stockpile rotation plan similar to that used in 1947-1949 which provides several methods for rotation transactions, utilizing both manufacturer and dealer resources, in various combinations.

J. E. Trainer, of Firestone Tire & Rubber Co., says the rubber industry is "well prepared" for an all-out war, and the time has come for the disposal of the government synthetic plants.

The Office of Price Stabilization is studying decontrol of tire prices, but action on all types of tires is not immediately likely. No action on the alleged second-line low-pressure tire price violations has been taken as yet.

RFC estimates on synthetic rubber consumption for the next six months is for more use of cold GR-S and increaing amounts of GR-S and butyl. October synthetic use may set new record.

The Rubber Manufacturers Association, Inc., was critical of the London *Financial Times* story of October 22 which indicated the American rubber consuming industry would use more natural and less GR-S rubber in 1953, which caused a significant rise in the price of natural rubber. RMA branded the story as without basis in fact and contrary to indicated trends.

P. W. Litchfield, Goodyear Tire & Rubber Co., stated that the results of the recent national election seemed likely to improve business prospects, and E. J. Thomas, of the same company, anticipates a good year for the rubber industry in 1953.

John L. Collyer, The B. F. Goodrich Co., called for an increase in worker productivity and an investment of $200 billion dollars in the 1950-1960 period to provide for the needs of our growing population.

Harvey S. Firestone, Jr., described the development of the Firestone plantations in Liberia in support of the belief that private capital invested in an underdeveloped country can bring benefits to all.

L. A. McQueen, General Tire & Rubber Co., also was enocuraged by the results of the national election and said that salesmanship will be the only answer to production and profits in 1953.

The plastics industry is to continue at a record level of activity well into the first quarter of 1953, according to The Society of the Plastics Industry, Inc.

Washington Report by Arthur J. Kraft

Possible Effect of Election on Synthetic Plant Disposal

Your reporter's impression, expressed in the November Washington Report[1] commenting on the text of the hitherto secret rubber industry disposal recommendations to the Reconstruction Finance Corp., that these recommendations would meet with something less than enthusiasm in government quarters has been borne out by subsequent sampling of opinion in Washington.

The Recent Industry Plan

The industry recommendations, presented by a 10-member disposal subcommittee of the RFC Rubber Industry Advisory committee under the date of August 19, 1952, were advanced as the unanimous view of a group representing a broad cross-section of the industry. The industry report played down the importance of the government insisting on high purchase prices for the 22 facilities being considered for sale, advanced a sales formula under which 90% of the ultimate purchase price could be paid on the basis of product throughput (a given amount per ton produced), and so restricted the conditions of sale that only rubber companies would have an opportunity to vie for purchase of most of the plants. The industry suggested that sale price be negotiated, rather than subjected to bidding, and that actual transfer of plants be held up until all negotiations have been concluded.

The industry plan, therefore, gives the rubber companies bargaining advantages by pretty nearly confining the eligible purchasers to a relatively small group—rubber companies with proven ability to operate the plants. The terms of payment for plants sold are far from exacting, since they are tied directly to the level of operations at each plant. Negotiations rather than sealed bids—or bids of any kind for that matter—could invite less competition between prospective buyers in nominating their purchase offers and, therefore, lower the price.

The industry plan, while noting that the aim of Congress has been creation of a competitive, privately owned synthetic rubber industry, failed to gird its proposal with provisions designed to assure strict conformity with the philosophy of the anti-trust division of the Department of Justice. The industry proposal, to be sure, set up a method to assure supplies of GR-S for smaller consumers of GR-S but said nothing about the Justice Department's hope for a maximum variety of ownership of the plants. An acknowledged weakness of the industry proposal is that it specified mandatory usage of GR-S and butyl, even though it stated that reliable supply-demand forecasts assure a high usage of synthetic rubber, making consumption floors unnecessary.

Not all these flaws, if they be regarded as such, should be held the full responsibility of the industry representatives who drew up the report. The industry subcommittee was required, when assigned the task of drawing up disposal recommendations, to follow the "principles" laid down in the Steelman report of 1950, a document hammered out by representatives of 13 government agencies concerned with rubber. The directive to follow the Steelman report in principle came from no less an authority than President Truman himself in a letter to RFC Administrator McDonald early this summer. The President also directed McDonald, in making a start on disposal planning to consult other government agencies, and specifically to consult with Jess Larson, Administrator of General Services, because of his wide experience with surplus property settlement as former chief of the War Assets Administration. The President's directive to McDonald and a letter from McDonald to the industry committee were read to the disposal subcommittee by Morton E. Yohalem, special deputy for disposal to the Administrator of RFC, at his meeting with the industry representatives June 9 and 10.

It has been said that the industry subcommittee through the course of its deliberations felt shackled by this directive to follow the Steelman report principles, and that at least several members would have advanced other ideas had the subcommittee not felt bound to follow the Steelman principles closely. This attitude is particularly true as regards the terms of payment, the method of paying on the basis of "throughput," and the obligation for the government to take back the plant, at the purchaser's option, without further payments being made to the government. This idea particularly has met with scorn on Capitol Hill when it was advanced by individual companies several years ago. The Steelman report, it may be remembered, got a pretty rude brushoff by the House and Senate.

This reporter does not know to what extent the industry recommendations might have differed from those presented in its report had it not been bound to follow the Steelman report principles. Many of these principles reflected industry thinking as it stood several years ago, when the rubber companies seemed less enthusiastic about owning plants than they are today. It should also be noted that the Steelman report was run through with compromise, much of it aimed at satisfying the views of industry, as well as various government agencies with special interests, such as the Munitions Board, which was anxious about protecting national security, and the Justice Department and Federal Trade Commission, equally anxious to prevent control of the synthetic rubber industry by a relatively small group of large companies which think and might act alike.

Probably an accurate assessment of the industry disposal recommendations would have to concede that the latter do not represent unanimous industry views but do

[1] India Rubber World, Nov., 1952, p. 240.

represent pretty much what the rubber companies would like to have, but do not expect the government to agree to. In other words, it is the industry's first statement of its bargaining position and reflects a good deal more than it expects to get.

Estimate of Effect of Elections

That the industry will not find its proposals adopted in full seems fairly assured, even with a Republican Administration and Congress in office in the coming two years when the disposal problem will be tackled. President-elect Eisenhower is likely to follow the lead of Congress on rubber legislation. In the House the matter will be handled by the Armed Services Committee, whose chairman will be Dewey Short of Missouri. Short is virtually certain to turn the matter over to Paul Shafer, the veteran rubber expert on the House side, whose thinking has guided both House and Senate action on rubber for the past five years.

On the Senate side, jurisdiction is less settled. In the last GOP Congress the Banking Committee got the rubber legislation, and Senator Bricker was named head of the Banking subcommittee to consider it. In the last Congress, where Senator Bricker's influence was less, his effort to get Banking Committee jurisdiction failed, and the legislation was handled by the Senate Armed Services Committee, with Lyndon Johnson of Texas named head of the special rubber subcommittee. Senator Bricker succeeded only to the extent of having Banking Chairman Maybank get the Armed Services Committee to agree to keep the Banking Committee advised of its plans and conclusions. As it worked out, the Banking Committee (and Bricker's) influence was reduced to no more than having a staff aide of the Banking group sit in on Johnson's hearings. Bricker probably will get chief jurisdiction in the new Congress, although he may have to consult with the Armed Services group.

Bricker after the recent election informed industry circles that he still favors disposal of the synthetic plants to private industry. As in the past, his views will probably be molded primarily to those of the rubber firms in his home state.

Shafer, on the other hand, has stood by disposal as an ultimate objective, but in the past has not felt the time propitious to move. In the past year or two he has been virtually silent on the rubber situation, except for two statements. In both he expressed strong concern that the government's operations not be conducted so as to jeopardize the economic health of the natural rubber producing nations of Southeast Asia. Using our stockpiling program or synthetic rubber factories to damage the natural rubber producers, he warned, would hurt Britain, which relies on natural rubber for a good part of its dollar earnings and would invite Communist control over the world's major source of natural rubber.

Shafer, with these statements, simply stated views which have now been echoed many times by the Truman administration. There is no question that these views are now basic considerations in this government's rubber policies and will not be changed in a Republican administration.

Another top priority consideration—and the major one in the past—has been the national security in rubber. The natural rubber stockpile was too low, Congress felt, to permit disposal of the synthetic rubber plants, which it characterized as our "best insurance policy for the security of the nation." Even industry and Administration leaders agreed that disposal under conditions of inadequate natural rubber should be contingent on mandatory consumption of synthetic rubber at a fairly high level. Congress took the position that as long as mandatory usage was required, the government should remain owner of the plants.

Today Congress is convinced that the natural rubber stockpile is fully adequate, and that disposal, without mandatory consumption controls, poses no danger to the nation's security in rubber. At most, Congress might insist on a recapture clause in contracts covering sale of the plants and a proviso that they be kept in readiness for rapid reactivation in event they are not actively producing. Congress probably will not make such clauses very stringent, but probably will be content to allow private operators full leeway provided they use the plants making rubber—any kind of rubber with general-use characteristics. Congress seems convinced that research and development of improved synthetics will be advanced more rapidly if the government were out of the synthetic rubber business.

The points of contention, then, are likely to boil down to lesser considerations, such as terms of sale, and in this area there is considerable disparity in opinion. The House committee is likely, it seems, to adopt the view that now is the time for a clearcut decision on whether private industry or government should own and operate the synthetic rubber industry. It may, in effect, serve an ultimatum on the industry either to buy the plants, or some of them anyway, at fairly high prices, or face a Congressional decision to freeze the facilities as a government operated enterprise, with no more talk of disposal.

The House is likely to suggest that the findings of the current independent appraisal of the facilities be taken as the starting point for determining prices. The value set upon each plant by the appraisal survey will be a floor price. Bids will then be sought for interested buyers, based on the publicly announced appraisal value, with a requirement that more than one bid, and possibly three, be submitted for any plant before a sale could be pursued further. Each prospective buyer would be limited to buying only one copolymer plant—to stimulate higher bid offers.

The above about sums up the current thinking in some Congressional quarters. The Administration might take exception to insisting on multiple bids for a particular facility, since these would be hard to get in most cases and might invite collusive biddings. The Administration, too, feels it is in a position to insist on pretty high prices—at least the value set by the appraisal report now due about February 1—because it is convinced that the nation will be consuming greater amounts of rubber. It has no fear that a market will not be found for a good deal of synthetic rubber. This fear, it should be noted, strongly influenced the terms of sale advanced by the Steelman report and copied, perhaps reluctantly, by the industry disposal subcommittee in its recent report to RFC.

The Justice Department is likely to take a jaundiced view of any one company controlling more than one plant, particularly in the case of the two butyl plants, where Standard Oil Co. of N. J. subsidiaries now operate both for RFC. It may also want more encouragement to chemical and oil firms to get into the synthetic rubber business and therefore is likely to take a dim view of the rubber companies' proposal giving the rubber industry the lion's share of any facilities sold in an initial go-around and an exclusive crack at any facilities put up for sale subsequently.

Congress probably would insist that only one opportunity be given to buy plants. Any facilities not sold in an initial go-around (or a specified time period) would be permanently frozen in government hands and placed in standby for reactivation in event of war.

Stockpile Rotation Plan Approved

General Services Administrator Larson formally approved a natural rubber stockpile rotation program in November that is identical to the program which guided rotation in the 1947-49 period. The program provides several methods for rotation transactions, utilizing both manufacturer and dealers resources, in various combinations.

The reason why it took some four months to finalize a program to guide operations after the GSA terminated its exclusive importing role on June 30 is that the stockpile officials wanted to make a thorough examination of other possible rotation methods, which would reduce rotation costs to the government.

With this point in mind, the Emergency Procurement Service of GSA in early August formally suggested that to the maximum extent possible rotation be conducted directly with those manufacturers with buying facilities in overseas markets. Such transactions would be a simple exchange of rubber between EPA and the individual rubber goods manufacturer, thus eliminating payment of a middleman's fee. A typical transaction would involve a swap of a lot of rubber from a government warehouse and the manufacturer's plant and the overseas point of origin and the manufacturer's normal U. S. port of delivery. The advantage to the government would be twofold: no handling fee to a dealer and no market price risk.

This plan was dropped, primarily because not enough manufacturers had adequate facilities to make it work. At least, not all the manufacturers with overseas buying agents in their own employ appeared willing to deal with the government exclusively on this exchange or swapping basis. In addition, the dealer trade wanted to be cut in on the rotation business, although EPS had pointed out, in arguing for its plan, that the dealers already had earned commission on the very same rubber which is now being put up for rotation, since regular dealer facilities were utilized when GSA was exclusive buyer during the 18-month period which ended June 30, 1952. Almost all of the 12,000 tons on the current rotation schedule—that released in early August—consists of non-storable grades acquired during the exclusive buying period when GSA was obligated to purchase all natural rubber shipped to this country. About half of this quantity has been rotated in the past few months, according to best estimates here.

The rotation program now in effect, then, provides these methods:

A manufacturer with overseas buying agents may buy directly from EPS and replace directly to EPS from his own incoming shipment.

Any manufacturer may buy directly from EPS, but not replace. In such cases, EPS goes into the market for the replacement, using the dealer trade for acquiring the replacement for its stockpile.

Any manufacturer may acquire a government lot, put up for rotation, from a

dealer and arrange for its replacement through a dealer.

EPS has adopted practices which apparently point to a policy of conducting the rotation program with the least possible risk of upsetting the always-sensitive rubber markets. Most significant of these practices probably are the decisions to sell-and-buy as near simultaneously as possible. EPS, when it sell a lot from its rotation schedule, contracts for the replacement within 24 hours. It attempts to close its books in a balanced condition at the close of business every day. Besides, the agency insists on delivery of the replacement lot within 30 days of the time it makes delivery of the rotation lot schedule. Both these practices work toward the least possible uncertainty in the market resulting from rotation transactions. EPS does not intend to sell out of the stockpile and keep the market guessing as to when it intends to get around to replacing the rubber.

These practices bespeak the strong official concern in Washington with maintaining the health of the natural rubber producing economies.

As noted in a previous story in the Washington Report for July, 1952, EPS has indicated that in exchanging nonstorable grades for storable grades it will keep its transactions within a reasonably narrow range—selling #4 for a #3 or #2, rather than seeking a drastic and swift upgrading of the stockpile. The agency, however, has not given up all its room for maneuver to take advantage of shifts in the price spread between grades. When warehouse inspectors inform Washington that certain lots must be rotated, a period of several months may elapse before these lots are placed on the rotation schedules. Whether they are placed on the schedule immediately or several months later will depend on how EPS analyzes the prospective market shifts. In this maneuvering, EPS will be doing no more than any private dealer —with an eye to profits—does.

EPS has issued the following list of the permanent specification grades of natural rubber which it will buy as replacement for rubber rotated out of the stockpile. These are the only grades in which the agency now is interested. The list follows: #1X RSS, #1 RSS, #2 RSS, #3 RSS, #1X Superior Thick and/or Thin Pale Latex Crepe, #1 Standard Thick and/or Thin Pale Latex Crepe, #1X Clean Thick and/or Thin Light Estate Brown Crepe, #2X Clean Thick and/or Thin Estate Brown Crepe, #1 Clean Thin Superior Light-Brown Crepe, #2 Clean Thin Light-Brown Crepe, and #2 Clean Thick Blanket Crepe (Amber).

Industry "Well Prepared" Declares Trainer

The American rubber industry is "well prepared" to supply military and a good part of civilian requirements for rubber products in the event of all-out war, J. E. Trainer, Firestone vice president, told a November 20 luncheon-meeting of the Washington Post of the American Ordnance Association. The Firestone executive spoke on "The Rubber Industry as an Ordnance Supplier."

Trainer estimated that even during an all-out war the rubber industry, based on mobilization plans as drawn up today, could devote 30% of its capacity to civilian production. In the event of a major war, the current plans would require that 43% of the industry's capacity go toward direct military items, and 27% toward indirect military items, such as truck tires for transportation within the United States. The remaining 30% available for civilian production, he said, would to a large degree make an essential contribution to the prosecution of a war, going into items such as tires for autos and buses which carry workers between home and defense plants.

Trainer asserted that control of the German synthetic rubber production by that nation's chemical industry during World War II contributed to the downfall of German armies. In the United States, on the other hand, the rubber industry had the responsibility both of making and using the synthetic rubber, and the corresponding opportunity to "tailor" the raw material to the best advantage, he said.

Otherwise, both the United States and Germany started from pretty much the same point, both of them far short of the natural rubber they needed and just starting the production of synthetic rubber, he noted.

German rubber experts, he added, the originators of the GR-S type synthetic rubber, "would not believe that the American jeeps and command cars rolling at high speeds up and down the autobahns were using tires made with over 90% of synthetic rubber." In Germany the chemical industry made the rubber, and the rubber processing firms "were handed the synthetic rubber on the basis that 'This is it—now you use it,' " Trainer declared.

Aside from its interest as history, it seems evident that Trainer raised this point as a lesson for our times in the context of the prospective early disposal of the synthetic rubber industry, a recognized bulwark in America's defense. The rubber goods manufacturing industry has already gone on record with a proposal that the bulk of the government's facilities be placed in the hands of the rubber industry, rather than non-consuming industries, such as chemicals or the petroleum industry—which are the other obvious candidates for ownership of synthetic rubber plants.

In speaking of disposal to the Ordnance group, Trainer confined his remarks to a statement of his firm belief "that the time has arrived when these plants should be sold, under adequate security provisions, to private industry."

Comparing the position of this country and its rubber industry today to the situation in 1941, Trainer said that "it is gratifying to note that we have:

"First—A larger natural rubber stockpile, sufficient to sustain a five-year war effort." [He estimated the government stockpile at over one million long tons, with another 150,000 tons in the hands of industry or en route to this country. In 1941, total stocks were 640,000 tons.]

"Second—A synthetic rubber producing capacity of more than one million tons a year, compared with a capacity of 12,000 tons a year in 1941.

"Third—Improved synthetic rubbers that have the effect of increasing still further our supply position, as compared with 1941." [He noted that "the next major step in making our country more secure with respect to rubber may be the development of a synthetic fully suitable for use in large multiple-ply truck and military tires."]

"Fourth—The know-how to make good products out of synthetic rubber compared with our have to 'start from scratch' in 1941.

"Fifth—Increased capacity—by 75% in sizes most critical for a war effort—for converting our rubber supplies into tires and tubes."

The first job of the rubber industry as ordnance supplier, the speaker con-

CALENDAR

Dec.	19.	Chicago Rubber Group. Christmas Party. Morrison Hotel, Chicago, Ill.
Jan.	14.	Newark and New York Sections, SPE. Military Park Hotel, Newark, N. J.
Jan.	15.	Quebec Rubber & Plastics Group. Queen's Hotel, Montreal, P.O., Canada.
Jan.	19-22.	Plant Maintenance Conference and Show. (Special Rubber Industry Sessions, Jan. 20-21.) Public Auditorium, Cleveland, O.
Jan.	19-23.	American Institute of Electrical Engineers. Winter General Meeting. Hotel Statler, New York, N. Y.
Jan.	20.	Elastomer & Plastics Group, Northeastern Section, A. C. S. Massachusetts Institute of Technology, Cambridge, Mass.
Jan.	21.	Washington Rubber Group.
Jan.	21-23.	Society of Plastics Engineers. Annual Technical Conference. Hotel Statler, Boston, Mass.
Jan.	23.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Jan.	25-28.	National Sporting Goods Assn. Convention and Show. Hotel New Yorker, New York, N. Y.
Jan.	30.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
		Akron Rubber Group. Mayflower Hotel, Akron, O.
Feb.	3.	The Los Angeles Rubber Group, Hotel Statler, Los Angeles, Calif.
Feb.	5.	Northern California Rubber Group.
Feb.	11.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Feb.	13.	Detroit Rubber & Plastics Group, Inc.
Feb.	17.	Elastomer & Plastics Group, Northeastern Section, A. C. S.
Feb.	18.	Washington Rubber Group.
		New York Section, SPE. Hotel Gotham, New York, N. Y.
Feb.	18-20.	SPI Reinforced Plastics Division. Shoreham Hotel, Washington, D. C.
Mar.	1-31.	American National Red Cross. Annual Campaign for Funds.
Mar.	5.	Northern California Rubber Group.
Mar.	10-11.	Society of Plastics Industry (Canada), Ltd. Eleventh Annual Conference. General Brock Hotel, Niagara Falls, Ont.
Mar.	11.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Mar.	17.	Elastomer & Plastics Group, Northeastern Section, A. C. S.
Mar.	18.	Washington Rubber Group.
		New York Section, SPE. Hotel Gotham, New York, N. Y.
Mar.	15-20.	American Chemical Society, Los Angeles, Calif.
Mar.	16-18.	National Assn. of Waste Material Dealers, Inc. Fortieth Annual Convention. Conrad Hilton Hotel, Chicago, Ill.
Mar.	18-20.	Division of Rubber Chemistry, A. C. S. Hotel Statler, Los Angeles, Calif.
Mar.	27.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
		Akron Rubber Group. Mayflower Hotel, Akron, O.

tinued, is to provide tires and tubes. Since 1941 the industry's capacity for making larger-size tires—the sizes needed by the military—has increased from 40,000 tires a day to 70,000 a day, an increase of 75%. Passenger-car tire capacity has increased about 50% over the 11-year period.

"Basic compounding, mixing, and milling facilities," Trainer explained, "have been extended to balance both these expansions. If it became necessary to convert small tire building and curing capacity to the larger sizes, such an undertaking would not be nearly so difficult as if we had to provide the basic mixing and milling facilities."

OPS Studies Tire Decontrol; Action on Price Violations

With the expiration of existing price control authority only five months away (April 30), the OPS rubber branch now has under consideration a series of actions to suspend price ceilings on tire products.

Foremost among these are studies looking toward removal of price controls on tire repair materials and camelback and on manufacturer ceilings for original equipment tires and tires sold to the Federal Government. In both cases the market has been notably soft and is expected to continue that way, making ceilings unnecessary.

The rubber branch also is giving serious consideration to recommending decontrol for all tires at the retail level, where prices also are below ceilings and have been for a sustained period. The National Association of Independent Tire Dealers has formally petitioned for this action.

The agency's tire experts are reconsidering a once-rejected petition filed nearly a year ago by the executive committee of the RMA tire division for removal of price ceilings on all tires, including manufacturers' ceilings on passenger-car replacement tires. This petition was formally rejected in August by the OPS decontrol committee on the ground that prices generally were at or close to ceiling, falling below only during special holiday sales, but rising up to ceiling level at the conclusion of these brief sales. A consistently soft market price level was not demonstrated by the evidence, the committee felt.

In reconsidering this petition, the rubber branch is taking a piecemeal approach, looking at original equipment and government sales as one segment, at truck, earth mover, and other specialty tires as another, and at replacement passenger-car tires as yet another. The prospect of a favorable recommendation for decontrol of replacement passenger-car tires at the manufacturer (wholesale price) level seems unlikely at the moment, at least under current OPS decontrol standards.

The OPS, as of November 21, had not yet decided whether to bring court action against five tire firms for possible violations of price ceiling regulations on their sales of second-line low-pressure passenger-car tires. Representatives of the five firms involved—Goodyear, Firestone, Kelly-Springfield, Armstrong Rubber, and Mansfield—met with top OPS enforcement officials early in November and were invited to seek another meeting if and when they wished to present data in support of their case. Although only five firms are under investigation for alleged overpricing of these tires, the entire manufacturing industry is much concerned over the outcome of the investigation. If OPS asks the Justice Department to bring suit for restitution of the overcharges, other firms, though not legally culpable, may be forced by competitive conditions to offer rebates to dealers. At least that is one view. Normally, when OPS wins a damage suit, restitution is made to the government, rather than to the overcharged customers.

Another view is that successful government court action would fix on the industry new procedures for pricing tires, procedures which apparently would mean lower prices for some tires. Thus long after price controls expire, the new pattern could be enforced by pressure from dealers seeking lower prices. Competition among the manufacturers for dealer outlets is very keen.

In an order effective November 18, OPS permitted mail-order sellers of second-line low-pressure tires to set their ceiling prices at 75% of manufacturers' retail list prices for first-line low-pressure tires.

This action, Amendment 1 to Supplementary Regulation 118 of the General Ceiling Price Regulation, was intended to help the mail-order houses out of a price squeeze they would have encountered in observing SR 118. That order, issued September 10, fixed ceilings for second-line LP's (low-pressure tires)—using the prices in effect in the previous 30 days as the first-line LP tire catalog price.

In the month prior to September 10 the catalog prices of several mail-order houses for first-line LP's were far below manufacturer list prices. Without the November 18 amendment the mail-order houses would have lost money on sales of second-line LP's, reportedly up to a dollar per tire in some houses. Mail-order houses account for less than 5% of total LP tire sales.

SR 118, as noted in the November Washington Report, in itself served to remove several manufacturers from the scope of the OPS enforcement division's investigation into possible ceiling price violations by manufacturers of second-line LP's. Among other things, that regulation also set the first-line LP's as the comparison commodity for a ceiling price on second-line LP's, which are a new product under the GCPR.

OPS legal interpretations rule that the proper comparison item for second-line LP's is a conventional tire, not another—and higher priced—LP tire. This point is at the core of the dispute between the five tire firms and the OPS legal and enforcement officials. SR 118 reflects the philosophy of the OPS operations officials, which supports the tire industry's view. This was recognized in an OPS statement of its reasons for issuing the amendment, which said:

"Although today's action will result in somewhat higher ceiling prices for some tires, these prices preserve the relationship between each seller's ceiling prices on first-line and second-line low-pressure tires."

RFC on GR-S Consumption Outlook

According to Harry A. McDonald, RFC Administrator, a growing preference for cold rubber, that is, LTP GR-S, is shown in estimates received from the rubber consuming industry for the current quarter of 1952 and the first quarter of 1953.

In a release dated November 11, RFC said that for the six-month period covered by the estimates manufacturers of rubber products forecast that they will call upon the RFC's synthetic rubber plants for a total of 315,517 long tons of GR-S rubber, of which 173,682 tons will be LTP and 141,835 tons will be the regular 122° F. GR-S. In addition, a requirement of 34,000 tons of butyl rubber (GR-I) used primarily in making inner tubes is estimated.

Of the GR-S requirements, the 55% estimate for the LTP is an increase over the consumption pattern of recent months, when use of LTP and the 122° F. polymer was about evenly divided.

The monthly estimates for the two types of GR-S synthetic rubber, in long tons, are as follows:

1952	122° F. Polymer	Low Temperature Polymer	Total
Oct.	22,803	27,662	50,465
Nov.	22,637	26,871	49,508
Dec.	23,223	28,948	52,171
Quarter Total	68,663	83,481	152,144
1953			
Jan.	24,472	30,061	54,533
Feb.	24,079	29,639	53,718
Mar.	24,621	30,501	55,122
Quarter total	73,172	90,201	163,373
Six-month total	141,835	173,682	315,517

The estimate for the current quarter is expected to prove conservative, according to E. Dorrance Kelly, director of RFC's Office of Synthetic Rubber, with actual shipments for October and purchase orders on hand for November pointing to a total demand for the quarter in the neighborhood of 158,000 tons of GR-S. RFC shipments of GR-S rubber in the third quarter of 1952 amounted to 153,781 tons.

Detailed figures from the industry also show a substantial trend toward oil master-batched synthetic rubber, Kelly said. While the recent average use of this type has been about 4,500 tons, estimates for November indicate that the demand for it may almost double.

The month of November also will see the heaviest demand for synthetic latex, with requirements reaching about 9,500,000 pounds, or 1,500,000 pounds higher than the average of the past six months.

The figures used in the estimates represent rubber, plus oil, less carbon black.

RFC Rubber Production and Sales

RFC sold 58,526.9 long tons of GR-S, including latex, and 6,669 long tons of butyl rubber in October—both figures, when compared to consumption figures for previous months, set new record highs. According to government figures, GR-S consumption was estimated at 52,928 tons for September and the previous all-time high was the 57,675 tons used in January 1952. RFC's sales figures and the consumption figures compiled by the National Production Authority are not strictly comparable, with consumption usually exceeding RFC sales. If this normal pattern holds for October, synthetic consumption may prove even higher than the sales figures indicate.

No official figures are available on November 21 on the total picture for October. However, Trainer, in his talk November 20 before the Ordnance Association in Washington, estimated that new rubber consumption would total 118,000 tons in October, including some 38,000 tons of dry natural rubber. Allowing for about 5,000 tons of natural rubber latex, this leaves a synthetic rubber consumption of about 75,000 tons, including GR-S, butyl, neoprene and other specialty synthetics. The previous recorded high was the 68,470 tons used in March, 1952. The previous

high for both natural and synthetic rubber combined was the 123,685 tons used in October, 1950, a figure never approached in subsequent months. This figure included 69,000 tons of natural rubber. That record month's usage of new rubber was unusually high because the industry had noticed that tight consumption controls to conserve natural rubber would be imposed effective November 1, 1950.

The October butyl sales figure reported by RFC compares with a consumption of 5,593 tons in September. No month since 1946 matched the October total of 6,669 tons—the closest was the 6,208 tons in August, 1951.

October sales of GR-S included 31,885 tons of LTP GR-S, a high figure, and 3,438.9 tons of GR-S latex. October GR-S sales also included 10,516.4 tons of black masterbatch, 6,918.8 tons of oil masterbatch, 1,480.8 tons of oil-black masterbatch, all of these figures given as the gross weight of the oil, black and GR-S contained.

Based on manufacturer forecasts of requirements, November production has been scheduled at 46,000 tons for GR-S, including 3,591 tons of latex. LTP GR-S output has been scheduled for 21,730 tons, black masterbatch for 9,000, oil masterbatch for 6,000 oil-black masterbatch for 1,339 tons, and butyl rubber for 5,500 tons.

Although it "oversold" production in September and October, RFC reports it still has adequate stocks (the last reported figure was 105,174 tons for GR-S on September 30). The recent order reactivating two line at the Kobuta, Pa., alcohol butadiene plant should bear fruit in January. One line is expected to be in operation about January 1, and the other a few weeks later. These operations will make possible an increase of several thousand tons a month in GR-S output. RFC has under consideration reactivating additional lines, probably at the Louisville alcohol butadiene plant, but no decision has been made on this.

DPA Tax Certificates

Certificates for rapid (five-year) tax amortization were granted to firms in the rubber, plastics, and associated industries between October 29 and November 19 by the Defense Production Administration. The location, the product or service, the total amount involved, and the percentage to which the rapid tax amortization may be applied are given.

Okonite-Callender Cable Co., Paterson, N. J., fire control cable for the military, $7,024 at 70%.

Arizona Chemical Co., Panama City, Fla., alpha-pinene, beta-pinene, and solvents, $635,000 at 45%.

Firestone Tire & Rubber Co., Akron, aircraft parts, $160,000 at 40%.

Thompson Products, Inc., Cleveland, O., aircraft components, $966,321 at 65%.

Union Carbide & Carbon Corp., Cleveland, O., military batteries, $264,000 at 65%.

Shawinigan Resins Corp., Springfield, Mass., vinyl resins, $93,175 at 45%.

United States Rubber Co., Providence, R. I., ordnance, $20,873 at 45%; Woonsocket, R. I., ordnance, $6,914 at 45%.

Whitehead Bros. Rubber Co., Trenton, N. J., high-pressure steam hose for military use, $122,888 at 45%.

Other National News

London Story on "Reduced GR-S Use" Arouses Ire of RMA

An article which appeared in the *Financial Times*, London, England, on October 22, stating, "The U. S. rubber manufacturers have decided to use more natural rubber in tires and other products and less of the American-made general purpose synthetic . . . . As a first stage manufacturers plan to adjust the basis from 65-35 to 55-45 and then aim at an eventual 50-50 consumption of natural and synthetic rubber," was denounced as unfounded by the RMA.

The story also carried the statement that: "The U. S. RFC which operates the government owned synthetic rubber plants has limited production from this month to an annual rate of 600,000 tons."

The story was widely quoted and repeated in other British publications, and there was an immediate market reaction to this alleged "plan," resulting in an overnight increase in the price of natural rubber.

It has been learned, the RMA said, that the original story grew out of conversations at a London cocktail party where reporters asked certain questions of a Canadian visitor. This visitor could not, and did not reply for the United States, but confined his remarks exclusively to the Canadian situation. Apparently the unanswered questions, some of them attributed to a representative of the Rubber Growers' Association, became the source of the newspaper article.

The RMA said that at this late date (November 7) the truth may not be considered newsworthy, but the facts are as follows:

1. The American rubber manufacturers have not, will not, or cannot reach a collective "decision" concerning the future use of natural and synthetic rubber. Such an agreement would be illegal under America's anti-trust laws.

2. The ratio of natural to synthetic depends upon the individual judgment of each separate company. This practice has been true since government specification controls were revoked in April, 1952. The overall industry ratio is the accumulative result of thousands of individual decisions.

3. If it were legal, American rubber manufacturers would never discuss, let alone agree upon, ratios of rubber use. This point is considered important confidential information to be withheld from competitors.

4. Industry-wide estimates are made of probable future natural and synthetic consumption. These informed guesses are made by industry economists and statisticians. Estimates covering the balance of 1952 and for the year 1953 made very recently indicate that natural rubber consumption in the U.S.A. will not reach 45% during the period covered. Although U. S. natural rubber consumption in 1953 may exceed that of 1952, it is by no means certain, all factors considered, that the 1953 import rate will exceed that of 1952.

5. Natural rubber competes with American-made synthetic rubber on the basis of price and quality. The latter factor is continually overlooked by natural rubber suppliers. The use of clean, well-packaged, easy to process, and technically uniform synthetic rubber is preferred in many products to poorly packed, off-grade, and non-uniform natural rubber, even at an initial price disadvantage. Also, technical and chemical improvements continue to be made with synthetic rubber.

6. There is absolutely no quantitative limitation, statutory or otherwise, on the production of synthetic rubber in government owned plants. Only recently RFC decided and announced that GR-S production will be increased to a rate in excess of 600,000 long tons annually in order to satisfy industry's increased requirements.

In conclusion, the RMA stated that sources of factual information concerning the American rubber manufacturing industry are available to foreign publications, and it hoped they will in the future check the accuracy of their stories concerning the United States.

The price of natural rubber on the Singapore market rose 2¼ cents (Straits) per pound on October 23, following the *Financial Times* story. The news also apparently stimulated price rises in other world markets, which led to further increases in Singapore in the succeeding two days, bringing the total rise in three days to 3⅝ cents (Straits) per pound.

Litchfield and Thomas Optimistic on Business Outlook

In a statement released shortly after the results of the national elections became known, P. W. Litchfield, chairman of the Goodyear board, pointed out that while no one can accurately foretell the effect of the November 4 election upon business trends of the near future, it seems certain that the overall prospects are for basic and far-reaching improvement.

An era has ended, a new era has begun, he added. Basically, the nation has turned from far left to center and in such decisive manner as to leave no room for doubt.

Litchfield said it seems clear that the people have voted to: (1) reverse the trend toward national socialism and dangerous inflation; (2) end the growth of labor monopoly; (3) stop squandering our natural and productive resources; (4) restore incentive to the individual citizen and remove the harassing and unfair restraints that have been placed upon private initiative and individual freedom; (5) return to the high moral and spiritual standards upon which our nation was founded; (6) deal realistically with matters of foreign policy.

There is every reason to expect that the new administration and the new Congress will promptly and aggressively respond to these significant new directives, and that in responding they will gradually establish improved conditions for all phases of business activity.

This is not to say that there will be an abrupt change in the overall picture of business activity. Certainly business will not want or expect any undue favoritism including repeal of measures which protect employes and consumers against self-

ish exploitation. It is reasonable to hope, however, that the punitive, discriminatory attitude toward business, as it has too often been expressed in bureaucratic action, will be replaced by a more temperate approach, and that there will be more equity in business-government relations, declared Litchfield.

The passing era was not without its gains. They should not be lost. But the pendulum had swung too far to the left, and the threat to our liberties, our initiative, and our security had become ominous. The recent action of the Administration in seeking to invoke inherent powers which could have established a virtual dictatorship was cited in this connection.

We now enter the last half of the twentieth century with the pendulum swinging toward center. Our new President-elect has expressed his intention to pursue a middle course and to avoid extremes of either the right or the left. This attitude will make it possible for the nation to go forward, and its free people to make the most of their opportunities, Litchfield concluded.

E. J. Thomas, president of Goodyear, in a talk before an Akron, O., audience in mid-November, said that he looked for a good year for the rubber industry in 1953, with rubber consumption breaking all records, and tire production the best in five years. He estimated rubber consumption for the United States at around 1,288,000 tons in 1953, of which 58% will be synthetic and 42% natural rubber. Tire production will probably pass the 100-million mark in passenger-car, truck and bus, airplane, motorcycle, and tractor categories.

Increased use of rubber, Thomas said, is brought about by two factors. More vehicles are on the road, and the owners of these vehicles are driving more miles and hence wearing out more rubber per vehicle. Newer rubber products are expanding their markets tremendously. Foam rubber is booming; films and plastics are on the rise; and rubber roads give promise of rapidly expanding commercial use.

Another encouraging part of the picture is that the synthetic rubber industry is providing a great bulwark of protection against the historic instability of the natural rubber market—a condition which has seen prices fluctuating between the extremes of 3¢ to $1.25 a pound.

Looking beyond 1953, the Goodyear president sees some danger signals. One is a threatened rubber shortage unless we expand our American synthetic rubber capacity. A second is the rapidly developing crisis of our inadequate highway system.

America today is consuming 18 pounds of rubber per capita, compared with one pound in 1900, and the rest of the world is consuming a little over a pound per capita. By 1960, he predicted, world demand for new rubber will be far beyond our present supply.

Goodyear's entry into the atomic energy field, explained Thomas, was prompted by two primary considerations. The company believes that America must lead in atomic developments, for national defense and security. Second, the atomic age will bring far-reaching changes in our economic productivity and social progress, and Goodyear wants to be in step with this great movement.

Collyer on Productivity

Past gains in the United States, both social and economic, have been made possible by the application and encouragement of invention, development, initiative, and personal ingenuity, not by government directives and government spending, Collyer of Goodrich, told a meeting of the Society for Advancement of Management in Dallas, Tex., in late October.

Collyer, in Texas for the opening of a new Goodrich distribution center in Dallas, said that "a competitive economy is possible only when the people themselves have the power to decide how their money shall be spent.

"There is justification," he stated, "for the view that our economy will not collapse when government expenditures are substantially reduced, although there might well be a falling off in gross national product at some time during the transition. It seems to me that those who see only the dark side are not giving due weight to the fact that we have enjoyed many prosperous years in the past when government expenditures were only a small part of our total economy, a smaller part than is probable any time in the foreseeable future."

Collyer said that by 1960 we should have 174 million people in this country, 22 million, or 15% more than in 1950. An increase in population is not necessarily a stimulant to business. Today more people in India and China might simply lead to more starvation.

The situation in the United States is quite different, he added. With our competitive economy, our abundant natural resources, our technical facilities, and our substantial "know-how" for producing goods and services, increases in population can exert a stimulating effect on business.

He pointed out that a significant feature of the increase in population is that it will be most marked in the age group under 18 and the age group over 60; while relatively little increase is foreseen in the main working age part of our population, those between the ages of 18 and 60. The increase in population in this country will be mainly an addition to the consuming group rather than the producing group, and this population trend will put upon those at work the task of supporting a much larger number of people, directly or indirectly, than in any previous period in our history.

"The task of producing the goods and services we will need can be accomplished only by a marked increase in the productivity of those who work. Only by increasing output per worker by 30 to 35%, or by working more hours per week, or both, will it be possible to maintain the greater population at a standard of living equal to or better than today's level," Collyer emphasized.

This increase in productivity cannot be obtained through manpower alone, but American industry will have to invest, during the 1950-1960 period, $200 billion, nearly as much as was invested in the last 30 years, if we are to achieve, with the working force available, adequate output to maintain our high standard of living. Based on these facts, it seems clear that there is opportunity for continued development of our economy," Collyer said in conclusion.

Firestone on Point Four

In a talk before the *New York Herald Tribune* Forum in New York, N. Y., October 20, Harvey S. Firestone, Jr., chairman of the Firestone company, entitled "Private Enterprise and Point Four," the development of the Firestone plantations in Liberia was described in support of the belief that private capital invested in an underdeveloped country can benefit all.

In 1926, when the project was started, Liberia was on the verge of bankruptcy, without roads and little means of communication. In that year exports amounted to only $1,750,000.

In 1951 exports totaled $50,000,000. Now 30,000 Liberians are on the Firestone payroll alone. More than 1,500 motor vehicles are registered, and there are hundreds of miles of good roads, with a new arterial highway under construction which will run from one end of the country to the other. Firestone has 90,000 acres planted, and in 1951 produced nearly 73,000,000 pounds of rubber. Aside from current obligations, Liberia began the year 1952 completely free from debt.

Details of the Firestone plantation development over the years were reviewed. Mention was made of the dedication, in January, 1952, of the Liberian Institute of The American Foundation for Tropical Medicine, in the memory of Harvey S. Firestone, Sr. Also, today there are more than 600 independent Liberian rubber planters, due to the efforts of the Firestone company. Last year these independent planters produced some 4,500,000 pounds of rubber, and within the next decade their output is expected to increase manyfold, it was said.

The investment of private capital in underdeveloped areas, combined with a sincere and earnest desire to bring benefits to the peoples of those lands on a basis which does not limit their national independence or their personal freedom, results in lasting and valuable benefits to all concerned. Not only do the investors benefit, but also the governments and peoples of the nations in which the investments are made, and the world benefits, because the ground for breeding Communism is no longer fertile, the Firestone executive declared.

"Here, then, is a proven and tested plan which brings benefits to the investors, which does not cost the taxpayer a single penny, which raises the living standards of the people of underdeveloped lands and which attacks at its source one of the greatest forces for evil the world has ever known," he concluded.

McQueen Sees 1953 a Good Year

Faced with its most competitive year in nearly a decade, business got its best possible break last November 4, when the people of the United States voted a change of government at the Washington level, L. A. McQueen, vice president in charge of sales, General Tire & Rubber Co., observed in opening the annual sales conference in Akron, of the company's national sales organization.

"First of all, business is going to get a hearing for the first time in many years," he pointed out. "The government has virtually run our business. It has told us what materials, and how much we should use in our products. But this will end now. There will be less government in all business . . . and thrift will again become a virtue."

Analyzing what's ahead for 1953, McQueen foresees a production of nearly 95,000,000 units in the tire industry, but believes the salesman will provide the answer to failure or success of his company.

"The shortages are definitely over in all commodities," he insisted. "No business of any nature will succeed without salesmen in 1953 . . . which must definitely be considered a buyer's year.

"Only the salesman can provide full employment to America in 1953. Compe-

tition will be keen . . . and there will be no government prosperity through waste to help the weak. Salesmanship will be the only answer to production . . . and to profits," the General Tire executive maintained.

Even with fewer government jobs and less aid to Europe, McQueen predicted a good business year in 1953.

"With more economy in government, business, and personal habits, inflation will soon end . . . our dollars will have more value," he averred. "We at General Tire are expecting to do more business in 1953 . . . not less. Our sales record of 1952 will be better than our record high of 1951 . . . and our outlook was never brighter than it is now," McQueen ended.

SPI Sees Good Business Ahead

The Society of the Plastics Industry on November 17 stated that, at the moment, indications point to a continued record level of activity in most branches of the plastics industry, at least well into the first quarter of 1953.

The SPI monthly sales statistics for August showed a total sales figure for thermosetting and thermoplastic, extrusion and molds, of $16,075,286, compared with $12,367,882 for July and $14,546,454 for August 1951. Improvement was noted in all principal divisions, but was most pronounced in thermoplastic moldings, which showed an all-time high for the month at $8,044,215.

Thermoplastic molding sales for September continued to advance and were up some 14% over August figures, having amounted to $9,159,005, and thermosetting sales were up even more sharply from August, being 38% over that month's figure amounting to $7,503,873, the highest month recorded for the year to date. Of significance is the pronounced upturn noted in the sale of molds, the volume for which has advanced 20% over August sales, following a similar advance in August over July sales, indicating that the product sales trend is still up.

One uncertainty in the long-range picture is the current heavy dependency of the economy on government purchases which are scheduled to hit their peak during 1953. Their importance may be recognized by the fact that during the second quarter of 1952 such purchases stood at an annual rate of $78 million, compared with a total national product of $343 million. While many economists predict that the passing of the peak in government expenditures will be accompanied by some business recession, such a development is by no means guaranteed. There are other factors such as an anticipated improved government atmosphere in which business can operate, greater confidence on the part of investors and a lack of speculation and inventory accumulation during the present business upturn which all augur well for the business future, the SPI said.

Sales and Inventory Figures

The Office of Business Economics, United States Department of Commerce, in its "Industry Survey" of September, 1952, has provided figures on manufacturers' sales and inventory figures for rubber products for eight months of 1952, in comparison with figures for July and August, 1951, that are of interest. This particular publication also provides complete figures for the years 1949, 1950, and 1951, which will not be repeated here. The present revision of manufacturers' sales and inventories adjusts the series to the newly available benchmark data for the year 1949.

Manufacturers' sales and inventories totaled for the years 1949, 1950, and 1951 are also of interest.

Value of Manufacturers' Sales

(Adjusted for Seasonal Variations; Millions of Dollars)

1951		1952							
July	Aug.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
442	469	468	442	406	437	424	430	408	408

Book Value of Manufacturers' Inventories

(Seasonally Adjusted; Millions of Dollars)

1951		1952							
July	Aug.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
647	677	840	848	865	877	878	864	884	884

Manufacturers' Sales and Inventories, 1949-51

(Millions of Dollars; not Adjusted for Seasonal Variation)

Sales			Inventories		
1949	1950	1951	1949	1950	1951
3,050	4,321	5,264	540	554	816

Solomon Promoted

John W. Solomon, general sales manager of United States Rubber Co.'s textile division, has been named sales assistant to the vice president and general manager of the division. In his new position, effective January 1, Mr. Solomon will handle the sale of combed, carded, and synthetic yarns to the tufting and knitting trades and will have his headquarters at the company's sales office, James Bldg., Chattanooga, Tenn. He also will supervise the yarn salesmen at all locations throughout the country and will be responsible for the advertising and sales promotion of these yarns. He will also be Vice President W. E. Clark's advisory assistant on sales, advertising, and promotion, and distribution policies for industrial, asbestos, and consumer fabrics.

V. C. McQuiddy has been made the division's sales manager of industrial products, including tire cord, chafer fabrics, filter fabrics, mechanical and weaving yarns.

The two appointments were announced November 12 by Mr. Clark, who is also general manager of the textile division. He stated that the large increase in the division's sales volume during the past five years has made necessary these changes to bolster the merchandising control and coordination of these products.

Mr. Solomon joined U. S. Rubber in 1947. Previously he had been a vice president of Avondale Mills, Sylacauga, Ala.

Mr. McQuiddy started with U. S. Rubber in 1941 at its textile plant in Hogansville, Ga., he was transferred to the company's general offices in New York in 1942, was appointed a sales assistant in 1947 and manager of the yarn sales office in Reading, Pa., in 1949. Since 1950 Mr. McQuiddy has been sales manager of combed and carded yarns, stationed at company heaquarters. He will continue to be at the New York office.

Expanding Textile Activities

Woodrow D. Johnson has been named to the newly created position of merchandise manager of consumer fabrics for U. S. Rubber's textile division. As part of the firm's expansion in fabrics, Johnson will be responsible for merchandising the U. S. Royal line of consumer fabrics sold by the division. Johnson was previously sales and merchandise manager of men's wear blends for Deering Milliken & Co., and prior to that time had served in various sales capacities with Parker, Wilder & Co.

Johnson's appointment followed the announcement that U. S. Rubber is consolidating at Winnsboro Mills, Winnsboro, S. C., its consumer fabrics weaving operations formerly divided between that plant and Seaboard Mills, Burlington, N. C. In addition, an integrated spinning unit has been set up at Winnsboro to produce blends of synthetic fibers, according to W. E. Clark, vice president and textile division manager.

New Purchasing Agents

The appointment of new purchasing agents for the Baton Rouge, La., and Painesville, O., plants of the Naugatuck Chemical Division, was announced last month by Russell S. Tobias, director of purchasing, and C. H. Madison, assistant production manager, for the division.

Andrew McNeill, formerly purchasing agent at Painesville, has been transferred to the Baton Rouge plant. Mr. McNeill has been with the division since 1947.

John Brady, formerly a senior buyer of heavy equipment at the Naugatuck, Conn., plant, has been transferred to Painesville as purchasing agent. Mr. Brady joined the division in 1950.

Little League Baseball

Little League baseball is big league now, according to a special issue of U. S. Rubber's magazine, "*Us*," published in October. For boys 9-12 years of age, Little League baseball has surpassed the big leagues in size, popularity, and attendance during the past five years. In 1948 the Little League had about 416 teams in six states, but now there are more than 7,562 teams in 44 states. The 28-page issue of the company's magazine is devoted entirely to the history, organization, and growth of Little League baseball and the company's participation in this activity.

Arthur Nolan attended The Rubber Manufacturers Association, Inc., Natural Rubber Quality Seminar held at Chicago, November 17 and 18, as the representative of Institut des Recherches sur le Caoutchouc en Indochine.

Bertram A. Wilkes

Cabot Opens N. J. Office

Godfrey L. Cabot, Inc., Boston, Mass., carbon black manufacturing firm, has opened a new sales office for the convenience of customers in the New Jersey, Delaware, Maryland, Pennsylvania, and Virginia areas. These offices are at Citizens' Bldg., 40 Bayard St., New Brunswick, N. J.

Selected to head the office is Bertram A. Wilkes, representative of the Cabot companies serving customers in this same area for the past 15 years. A member of the Cabot organization since 1929, Mr. Wilkes has a thorough background of technical and sales experience.

Also attached to the New Brunswick sales staff is Charles R. Schroth, formerly with H. N. Richards Co.

Atomic Plant Personnel

Organization of key personnel for operating the government's $1,219,000,000 atomic energy plant being constructed near Portsmouth, O., is well under way at Goodyear Atomic Corp., newly created subsidiary of Goodyear Tire & Rubber Co. According to A. J. Gracia, manager of the new company, the folllowing supervisory personnel have been assigned to duties in the staff engineering and maintenance division headed by William A. Brown: Hugh F. Porter, Jr., head of the electrical and instrument division; Ralph J. Nance, superintendent of shops maintenance; Robert M. Rutherford, head of utilities and utilities maintenance; Thomas W. Leary, superintendent of process maintenance; Arthur J. Brust, superintendent of planning and scheduling; and Nathan H. Hurt, Jr., superintendent of staff engineering. These men have been transferred from other posts in the Goodyear organization: Porter, Brust, Leary, and Hurt from Goodyear-Akron; Nance from Goodyear Aircraft Corp.; and Rutherford from the Jackson, Mich., tire plant.

Two top scientists from the parent company's research laboratories also have been assigned to the Atomic enterprise: Charles R. Milone, now superintendent of the new company's research laboratory; and Richard B. Stambaugh, named superintendent of the works laboratory. Both will report to James A. Merrill, director of the laboratory division.

Foxboro Expands at Dallas

New factory facilities for the assembly of control valves were recently acquired at Dallas, Tex., by The Foxboro Co., Foxboro, Mass., manufacturer of the Stabilflo control valve and industrial instruments for process measurement and control. Convenient to the office address, 1710 N. Akard St., the new quarters practically double the area devoted to valve assembly and warehousing and will facilitate rapid delivery and service to industries throughout the South and Southwest which have been served from the Dallas branch for more than 20 years.

Also indicative of the trend toward custom-engineered control are the recently expanded valve production facilities at the Foxboro home factory, supplemented by Foxboro branch factory assembly and service at Pittsburgh and San Francisco. Industries in Canada and abroad are served by The Foxboro Co., Ltd., Ville LaSalle, P. Q., Canada, and Foxboro-Yoxall, Ltd., London, England.

Golden State Moves

Golden State Rubber & Latex Corp., Los Angeles, Calif., transferred its general offices and factory to 1538 W. 132nd St., Gardena, Calif. On nearly a half acre of ground is the new 7,500-square foot building with more than 10,000 square feet of additional area for expansion, parking, storage, assembly, and application work.

The company is a California corporation principally engaged in the manufacture of rubber products of natural, synthetic, silicone-type materials by special fabrication, press molding, light extrusions, and, where applicable, latex dipping, coating spraying, slush molding, or casting. Typical parts made are boots, bellows, seals, gaskets, punch-press parts, with or without fabric or metal inserts, ducts, forming bags, rubber coated metal parts, sheet or latex lined tanks and related assemblies, slush or cast-molded industrial and novelty devices.

Douglas Chalmers, president and general manager, has had 17 years' experience in research, testing, control, and production of plastics and rubber-like materials and products.

Sales Staff Changes

Kenneth L. Edgar, sales manager of Velon products of Firestone Plastics Co., Pottstown, Pa., last month announced the following changes in the sales staff:

Charles F. Edelmann has been named manager of manufacturers' sheeting sales. He was formerly staff trade manager in the film division.

Edward V. K. Jaycox is now manager of packaging and new products sales. Mr. Jaycox was previously in charge of marketing research.

Gurdon H. Smith has been named manager of upholstery sales, after having handled the sale of Velon upholstery sheetings in various territories including the Midwest and the Southeast.

Stuart G. Keiller continues as manager of Velon yarn sales; while the converting department will continue to be headed by Elmer H. French, Jr.

Sales promotion activities remain under Thomas A. Henry.

Joseph E. Cox

Cox in New Post

Joseph E. Cox, active in rubber sole and heel manufacturing and sales for more than 25 years, has been named resident manager of Essex Rubber Co., Trenton, N. J.

The appointment was announced by George S. Fabel, president of Thermoid Co., Trenton, which purchased stock control of Essex in 1951. The latter manufactures soles and heels and industrial molded rubber products. Mr. Fabel said an aggressive sales and product development program will be carried out at Essex under Mr. Cox's direction.

Mr. Cox, following service in World War 1, entered the export business. He joined Goodyear Tire & Rubber Co. in 1925, where his work was with shoe products. Immediately prior to joining Essex in 1946 he was assistant general manager of Goodyear's shoe products division.

Whittemore Board Chairman

Laurence F. Whittemore, president of Brown Co., 150 Causeway St., Boston 14, Mass., was named chairman of the board at the recent directors' meeting. Mr. Whittemore, who became president of the company on January 1, 1950, will continue in that capacity. He has been a director since 1941. His relations with Brown Co. actually began in 1935 when he became a member of the stockholder's committee with regard to reorganization and served as sub-chairman of the group.

Ernest H. Maling, senior vice president of Brown Co., who retired November 1 after 32 years with the company, was recently named vice chairman of the company's directorate at the same board meeting. Mr. Maling began with Brown in 1920 in the accounting department of the Portland office. In 1933 he was made comptroller of the company and in 1941, treasurer, with his office in Berlin, N. H. He became vice president of finance and accounts and treasurer in 1943.

Tom F. McAdams has become associated with Brown Chemicals, as sales representative to assist Dan D. Downes, with headquarters at 15 Moore St., New York 4, N. Y.

New Goodrich Warehouse

A long-term lease has been signed by The B. F. Goodrich Co., Akron, O., for a new, one-story brick and steel warehouse building at Highpoint, N. C. This new warehouse unit will be used as a distribution point for covered elastic yarn and Koroseal upholstery materials. Now under construction at the corner of King and Linden streets in Highpoint, the warehouse combines the operations of two smaller warehousing units which Goodrich had operated there. Office and display rooms, including 10,000 square feet of space, will be completely air conditioned.

When the building is completed in early March, it will enable Goodrich to stock larger quantities of elastic yarns and upholstery materials better to service hosiery and furniture manufacturers throughout the South.

Sales and shipments of covered elastic yarn from the new warehouse will be handled by Anthony & Garrett, BFG's sales representative in that area; while Koroseal upholstery materials will be handled by Ray H. Dover, Sr., sales representative for that commodity.

Collyer Receives Award

J. L. Collyer, Goodrich president, has been given a distinguished service citation by the Automobile Old Timers. The award was presented by J. E. Henry, president of the group, at the Old Timers' thirteenth annual dinner, which was held on November 13 at the Hotel Astor, New York, N. Y.

Staff Appointments

William L. Smith, Earl F. Miller, and Almont E. Williams have been named in connection with new assignments in Goodrich's industrial products manufacturing division.

Smith has been appointed technical director of industrial products manufacturing. His new responsibilities will be to integrate the technical activities of all industrial products operations. He joined Goodrich in 1917 in the laboratory originally, but has spent most of his time in the industrial products division. In 1942 he was appointed its technical superintendent.

Miller succeeds Smith as technical superintendent of the Akron industrial products division. Miller came to BFG in 1935, was assigned to research work, and two years later went into the processing division as a compound chemist. In 1944 he was transferred to industrial products for technical work, and his most recent title was technical manager of hose manufacture.

Williams has been given that post. He started with the company in 1946 in the general chemistry laboratory and worked in the processing division. His most recent job was as technical manager of industrial products.

Osbert H. Parrine, manager of time study and methods at Goodrich, has been named general manager, time study and methods. Parrine began with the company in 1925 in the time-study department. In 1930 he was assigned to Hood Rubber Co. in the same line of work and in 1937 became superintendent of standards there. In 1951, Parrine was returned to Akron to the position of manager of time study and methods.

Edward J. O'Connor has been made manager of a new department, field accounting—stores and districts, at Goodrich.

Hadley N. Ensign has been appointed general supervisor in the department, reporting to O'Connor.

O'Connor began in the company's field auditing department in January, 1943, where he remained five years before moving to accounting. He was most recently assistant manager of the department.

Ensign has been with the company 18 years and has been engaged primarily in accounting work.

Acclaims Tubeless Tire

The rubber inner tube may soon become a relic of the past, according to Frank T. Tucker, director of advertising for Goodrich. Speaking before the Milwaukee Advertising Club recently Tucker said that his company has already delivered more than a million tubeless tires to American motorists. The present rate of tubeless tire production in Goodrich plants is nearly triple that of last year. In addition, many new car manufacturers are now considering tubeless tires as original equipment, Tucker declared.

Multicolor Printing Process

A new process for transferring a multicolored, printed, screened impression from paper to rubber or plastics in one quick operation has been announced by American Anode, a division of B. F. Goodrich. Exclusive rights to this Anolith process have been granted to American Anode by Soledad Co., Los Angeles, Calif., which holds the patent. A feature of the process is that it permits true reproduction, in color if desired, of an image of even 300-line context, it is claimed. A separate printed label is required for each transfer, since the process is an ink-lifting method.

The process is said to be economical and rapid and to give images that last indefinitely. When the process is used on rubber surfaces, a slight curing operation will permanently seal the impression to the rubber. Multicolored impressions transferred by this process are said not to fade, but remain brilliant and sharp. According to R. V. Yohe, president of American Anode, the Anolith process opens the doors to many applications.

"We foresee such possible applications as various sidewall color combinations for tires, drapery patterns for vinyl sheeting, and imprinting of conveyor belting, rubber matting, recreational items, and a host of others."

Torque Converter Uses Hycar

Special hot oil-resistant seals made of Hycar 4021 (polyacrylic) rubber, a product of Goodrich Chemical, are used in a new direct-drive hydraulic torque converter for extra heavy-duty trucks developed by Twin Disc Clutch Co., Rockford, Ill. Designed for trucks carrying loads up to 30 tons, the converter eliminates 99% of forward shifting in off-highway operation. The hydraulic clutch actuating pistons and oil-pressure supply tubes in the converter are sealed with a total of 16 Hycar O-rings ranging in size from 3/8-15½ inches in inside diameter. Hycar 4021 is also used for other specially molded gaskets and garter spring seals in the unit. The Hycar seals meet the requirements of this application, including exceptional resistance to oils, extreme pressure lubricants, and high temperatures.

Voit Opens New Plant

W. J. Voit Rubber Corp., Los Angeles, Calif., formally opened its new camelback and tire repair materials manufacturing plant in Portland, Oreg., on October 25, with ceremonies attended by more than 300 industrial and civic leaders. Willard Voit, company president, Harry A. Wright, general manager of the new plant, and Neil W. McIntyre, factory production manager, acted as hosts to the visitors, who were shown round the plant and then entertained with a buffet luncheon. Included among the guests were the mayor and mayor-elect of Portland, as well as more than 200 persons directly connected with the tire recapping industry.

The new plant is a 16,000-square foot building on a 3½-acre plot that provides ample room for expansion. Approximately 40 workers will be permanently employed. Voit has already invested about $500,000 in real estate, buildings, and equipment, including three 60-inch rubber mills, one eight-inch extruder, and auxiliary machinery. The new plant has a production capacity of 500,000 pounds of material per month, and the first month's output was reported to have been purchased at the plan opening by recapping operators in the area.

New Sales Office

Monsanto Chemical Co., plastics division, Springfield, Mass., opened a Cincinnati sales office on October 15, bringing to six the total number of divisional sales offices operating east of the Rocky Mountains. According to R. C. Evans, the division's general manager of sales, the new office will help serve customers in the expanding midwestern and southern markets and also support the activities of the division's new production facilities at Port Plastics, O.

Harold D. Woodmansee has been named branch manager of this new office. He transfers from the division's Detroit sales office, where he has been branch manager since January 1, 1952. His Detroit responsibilities have been assigned to Donald H. Kocher, who has been promoted to assistant branch manager there. Woodmansee joined Monsanto in 1932, in the laboratories of the division's headquarters at Springfield and has been with the sales department since 1944.

Kocher joined the plastics division at Springfield in 1946. He has been a salesman since 1947 and attached to the Detroit office since 1951.

Dunlap Promoted

Ralph I. Dunlap has been appointed assistant director of research for the plastics division, which he joined in 1943 as a research chemist. He was promoted to group leader in the research department in 1946, became an operating superintendent in the production department in 1951, and in March, 1952, returned to the research department as group leader in charge of styrene research.

The Cincinnati Rubber Mfg. Co., manufacturer of mechanical rubber goods, Cincinnati 12, O., is erecting a new office building, a red and grey brick structure, 66 by 80 feet and two stories high. It will be air conditioned and will have acoustic tile and insulation ceilings.

Acquires Federal Tire Name

Tide Water Associated Oil Co., San Francisco, Calif., has acquired exclusive rights to the tire trade name, "Federal," under the terms of a contract recently signed with United States Rubber Co. The agreement, which also transfers ownership of all Federal tire molds and equipment, was signed by William F. Humphrey, president of Tide Water, and H. E. Humphries, president of U. S. Rubber.

Federal tires have a history which dates back to 1909. Tide Water became the exclusive distributor of U. S. Rubber's Federal tires and tubes back in January, 1947, and since then has expanded the tire line. At present the complete tire and tube line handled at all Tide Water service stations and outlets throughout the world includes the Federal Flying-A Safety-Ride premium tire, Air-Wing low-pressure tire, Classic, Air-Flex, mud and snow tractor tires, and commercial truck and bus tires.

Shawinigan Resins Elects

Robert K. Mueller was elected president of Shawinigan Resins Corp., Springfield, Mass., on November 3, to succeed the late F. A. Abbiati.

W. Roy Elliot, Shawinigan general manager, and Charles M. Schwab, a vice president of Shawinigan Products Corp., New York, N. Y., were elected vice presidents of Shawinigan Resins.

Charles H. Sommer, general manager of Monsanto Chemical Co.'s Merrimac Division, was elected a member of the board of directors.

Mueller was formerly general manager of Monsanto's plastics division.

Shawinigan Resins, an associated company of Monsanto Chemical Co., is operated by Monsanto's plastics division in conjunction with Shawinigan Chemicals, Ltd.

Statex 125 Wear Tests

Columbian Carbon Co., through Binney & Smith Co., 41 E. 42nd St., New York 17, N. Y., has issued a summary card giving the results of tire company tests with regular shipments of Statex 125, a super abrasion furnace black. These tests compare the wear ratings of stocks made with Statex 125 with similar stocks made with high abrasion furnace black. According to the summary card, tests with GR-S cold rubber treads showed Statex 125 to be 12-43% better than HAF black for wear: 31% better in natural rubber treads; 40% better in camelback; and 20% better in cold rubber belting.

Calco Given Safety Award

Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J., was presented with the company's safety award bronze plaque as a highlight of Cyanamid's "Safety Reminder Week," November 3-8. According to S. C. Moody, company vice president and division general manager, Calco won the award by working 4,271,464 man-hours without a lost-time accident occurring between March and October 1, 1952.

New Titanium Sales Office

Titanium Pigment Corp., subsidiary of National Lead Co., 111 Broadway, New York 6, N. Y., has opened a new sales office in Atlanta, Ga., at 367 John St, N.W., to serve the southeastern states in the sales of "Titanox" pigments. The Alabama and Tennessee sales territories, formerly under the Cleveland office, will be added to the Atlanta office.

Robert E. Noyes, a sales representative in Cleveland, is now in charge of the Atlanta office. Replacing Mr. Noyes in Cleveland is Paul Eliot, transferred from the technical service laboratories in New York.

Also announced was the transfer of G. Gordon Hennessy from the technical service laboratories to Chicago, where he will be a sales representative.

O'Sullivan Holds Election

At a special meeting held October 14 the board of directors of O'Sullivan Rubber Corp., Winchester, Va., elected Vincent A. Catozella chairman of the board, to succeed R. J. Funkhouser, who held the post 20 years. Mr. Catozella, elected president of the corporation, October 1, 1949, will continue in that office.

Paul Terretta, executive vice president, was given the additional post of treasurer, replacing P. L. Hockman, who resigned. H. Douglas Weaver, secretary, was made a member of the executive committee. R. S. Beck resigned as assistant secretary.

Yale Rubber Plant Opening

Yale Rubber Mfg. Co. celebrated the opening of its new million-dollar plant at Sandusky, Mich., with an open house on October 4, attended by hundreds of leading industrialists.

At the same time President Eldon H. Henderson announced the appointment of J. Willard Childe as sales manager of the Detroit branch. Henderson and Childe began their business association 26 years ago as sales engineers for Continental Rubber Works and parted seven years ago when Henderson left to found Yale Rubber.

Yale Rubber Officers at Open House Celebrating Its New Plant: (L. to R.) L. F. Runciman, Vice President; Eldon H. Henderson; R. C. Henderson, Treasurer; and W. D. Hough, Secretary and Detroit Branch Manager

Promotions at Wyandotte

Bert Cremers, vice president, Michigan Alkali Division, Wyandotte Chemicals Corp., Wyandotte, Mich., recently announced the following divisional promotions in the home office: C. F. Sanborn, to manager, sales research and control; F. M. Zorn, to manager, order and scheduling department; M. D. Thompson, to assistant director of traffic..

Mr. Sanborn's new department encompasses the former market research and sales control departments. Brought about by Wyandotte's ever-increasing marketing activities, this new department more fully integrates the sales program. Mr. Sanborn came to Wyandotte in 1941, then saw military service for three years, and upon returning to Wyandotte worked as a market analyst . . . in 1951 he was appointed manager of the market research department.

In his new capacity Mr. Zorn is in charge of order and scheduling activities for the division's many products. He was formerly assistant to the product manager of heavy alkalies and chlorine.

Thompson has more than 38 years' experience with traffic and transportation problems, 12 of them with Wyandotte.

Opens New Sales Offices

Additional district sales offices for Pittsburgh Plate Glass Co.'s new fiber glass division, Pittsburgh, Pa., have been established in New York, N. Y., and Washington, D. C., according to Robert A. McLaughlin, director of sales for the division.

Paul D. Kaley has been named district sales manager in New York, with headquarters at 30 Rockefeller Plaza. Associated with the fiber glass industry since 1941, he is a member of the American Association of Textile Technologists, American Ordnance Association, and the Society of Plastic Engineers.

H. J. Bygott, Jr., has been appointed Washington district sales manager, with headquarters at 1545 New York Ave., N.E. Mr. Bygott has been with Pittsburgh Plate since 1935.

Pittsburgh Plate's first fiber glass plant recently commenced production at Shelbyville, Ind. Besides the New York and Washington offices, the division maintains district sales offices at Detroit and Chicago.

Philblack E Shipments

Phillips Chemical Co., Bartlesville, Okla., has announced that shipments of Philblack E, a super abrasion furnace black, have begun at its Borger, Tex., plant. According to K. S. Adams and Paul Endacott, board chairman and president, respectively, Philblack E is now available in carload and truckload quantities. On the basis of road tests covering 75,000 miles, the company claims that Philblack E incorporated into cold rubber auto-tire treads provides 30-42% more wear resistance than does HAF black. In natural rubber heavy-duty truck and bus tire treads Philblack E is said to give 12-24% more wear than channel black, in addition to phenomenal resistance to cutting and chipping. Annual production capacities for the company's three blacks are as follows: Philblack A, 119,000,000 pounds; Philblack O, 111,300,000 pounds; and Philblack E, 59,700,000 pounds.

Goodyear Expansion Plans

The Goodyear Tire & Rubber Co., Akron, O., last month announced plans for a $1,500,000 expansion program for its chemical division.

Russell DeYoung, vice president in charge of production, described the project as an addition to existing Akron facilities for producing Chemigum synthetic rubber. DeYoung said the expansion in the rubber chemical field will make available additional reactors for synthetic rubber used in industrial, architectural and highway paints; as rubber reinforcing agents; and for a score of other applications. These facilities can be used, too, DeYoung added, for the production of synthetic rubber latices, being used extensively in water emulsion paints, and for paper and fabric coatings.

Install Giant Belt Press

One of world's largest conveyor belt presses is being installed in Goodyear's flat belt production line in Akron. The 41-foot-long press requires two floor levels, and plant buildings had to be modified to permit installation. Designed and built by Farrel-Birmingham Co. with the aid of Goodyear belting engineers, the giant press measures 84 inches in width and is capable of vulcanizing conveyor belts up to 72 inches wide. The press has 32 rams, each 18 inches in diameter, and is capable of exerting a platen pressure of 275 psi. When installed, the press will cover an area of about 2,500 square feet, including wind-up, let-offs, and piping.

Wins Public Relations Award

A national public relations award will be given to Goodyear early next year for the firm's contribution to the transportation through its campaign for better roads. The award, the Silver Anvil Trophy of the American Public Relations Association, will be presented to Goodyear as the winner in the transportation classification at a ceremony which is scheduled for March 1 at the Mayflower Hotel, Washington, D. C.

Cleveland Conveyor Subway Proposed

The construction of a belt conveyor passenger subway in downtown Cleveland has been recommended to the city by William C. Reed, board chairman of the Cleveland Transit System. The conveyor would operate under Euclid Avenue between Public and Playhouse Squares, with two intermediate stops. Reed said that the cost of the system, designed by Goodyear, was estimated to be only a little more than half that of a proposed conventional transit loop. The 3,300-foot subway would use the same type of conveyor belt equipment designed by Goodyear for the proposed shuttle in New York, N. Y. The design calls for the use of small passenger cars riding on high-speed main conveyor belts, with slow-speed belts being used at the loading and unloading points.

Changes in Advertising Setup

An organization change in the advertising and sales promotion departments at Goodyear has been announced by Kenneth C. Zonsius, director of advertising.

Under the new setup D. T. Buchanan becomes manager of the advertising and sales promotion departments; G. G. Cartwright takes on the duties of advertising manager of general products departments; and H. F. Cook becomes advertising manager of the tire departments.

In announcing the changes Zonsius said that Buchanan will supervise all the activities of the departments headed by Cartwright and Cook.

Buchanan also will have supervision of the budget, aviation products, art, displays, identification, media, movies, operating, production, and Los Angeles office personnel.

Cartwright will be in charge of all advertising and sales promotion for the Airfoam, chemical, flooring, mechanical goods, Pliofilm, shoe products, and Vinylfilm sales departments.

Cook will supervise all advertising and sales promotion for the tire departments, including all types of tires and tubes (except aviation), retreading and repair materials, rims, car and home supplies, brake lining, and batteries.

Buchanan, who has extensive experience in the newspaper field in the United States and abroad, joined Goodyear's advertising department in 1928 as a copy writer, was appointed manager of Goodyear's advertising department in England in 1935, and returned to Akron three years later as manager of the firm's advertising department.

Cartwright has been with Goodyear since 1929, when he started as an advertising department staffman. He became assistant manager of the advertising department in 1941 and manager of sales promotion in 1944.

Cook began in Goodyear's advertising department in 1944, after serving in a number of responsible agency and newspaper advertising posts.

Truck Tire Problems

The greatly increased speed of truck travel on modern turnpikes and highways poses a serious tire problem to both truck operators and the rubber industry, according to George M. Sprowls, manager of highway transportation for Goodyear. Speaking before the Northwestern Pennsylvania Division of the Pennsylvania Motor Truck Association at a meeting in New Castle on October 25, Sprowls warned that truck tires operated at high speeds tend to build up extremely high internal temperatures, with a corresponding increase in the risk of tire failure. The rubber industry is trying to offset this hazard by constant improvements in truck tire quality and service. A tire built to withstand the strain of sustained high speed may not give quite all the mileage desired by the operator, Sprowls cautioned. Safety features are also being improved by the industry. As an example, Sprowls cited Goodyear's new electrical device to prevent skids and the resulting jackknifing of truck trailers. The device can be installed on each wheel of a car or truck and prevents the wheels from locking when brakes are applied.

Bicycle Tire Output Milestone

Bicycle tire production at Goodyear's New Bedford, Mass., plant recently reached a new milestone with the completion of the 15,000,000th unit. The first bicycle tire of this total was made on April 18, 1946. This plant was engaged in military production during the war and prior to that time had been one of Goodyear's textile plants.

Aircraft Deicer Program

A meeting of Goodyear engineering personnel and members of the design group of the Canadian National Aeronautical Establishment was held in Akron late in October to complete plans for equipment to be installed on the Establishment's experimental plane, the "Rockcliffe Ice Wagon," which serves as a flying laboratory for deicing investigations. Already fitted with Goodyear-made electrothermal deicing equipment on its propellers and dorsal fin, the plane will soon undergo installation of new Goodyear equipment on the leading edges of its wings, fins, and horizontal stabilizers. With this equipment there will also be placed in operation a new electrothermal system which is energized by the formation of ice, rather than by a timing device. Goodyear Tire & Rubber Co. and the Establishment are also commencing study of deicing on helicopters.

Sales Staff Changes

Sharples Chemicals, Inc., 123 S. Broad St., Philadelphia 9, Pa., has made two changes in its Midwest sales staff. R. H. Samis, who has been representing the company in the Detroit area, will now service all of Michigan expect the Upper Peninsula. Mr. Samis has been with Sharples for 26 years. His experience has included sales work, plant production, and administration.

Frank K. Hoover, who left the midwestern sales force two years ago to serve as assistant to the executive vice President, will represent Sharples in Minnesota, Wisconsin, the Upper Peninsula of Michigan, and the northern halves of Indiana and Illinois. Mr. Hoover has also served on the chemical engineering staff at the Wyandotte plant.

Army Carrier Uses Giant Tires

The new Army "Barc," a giant amphibious troop and supply carrier, depends on tires developed by Firestone for mobility on beaches and land. Said to be the largest in the world, each tire with its tube and flap weighs 2,952 pounds and stands 9½ feet high. According to Firestone engineers, the rubber used in the carrier's four tires would make more than 600 popular-size auto tires. The "Barc" is now being prepared for extensive land water tests by the Army Transportation Corps.

Firestone Receives Tribute

A tribute to Harvey S. Firestone, Jr., Firestone board chairman, for his services to the cause of better intergroup relations was made at a dinner in his honor tendered by the Automobile Division of the National Conference of Christians & Jews on December 8 at the Waldorf-Astoria Hotel, New York, N. Y. All branches of the automotive industry joined in the dinner event which was arranged by a committee under the chairmanship of M. M. Lasker, Dexter Motors, Inc. Besides the tribute to Mr. Firestone, the dinner also launched the industry's campaign to help the Conference's program of building good will and understanding between the different religious groups.

Stacomizer Press for Rubber Processing

Recent work at Armour Research Foundation of Illinois Institute of Technology, Chicago, Ill., indicates that the Stacomizer, a continuous hydraulic press employing two rolls and a floating ring, may permit substantial advances in the dewatering, working, and compounding of rubber. A report on preliminary work on rubber with this machine is given in an article, "The Big Squeeze," by J. D. Keane and F. W. Bickel, in the September issue of the Foundation's publication, *"The Frontier."*

The press employs a unique mechanical principle to obtain a high-capacity bite as it applies tremendous pressures on a continuous blanket of feed material. To date, potential advantages have been demonstrated in washing and dewatering rubber coagulum preparatory to drying; in the enhancement of polymer properties by working in the wet state; and in improved batch and continuous mixing of elastomers.

Basically, the Stacomizer, made by Stacom Industries, New York, N. Y., consists of a free-floating hollow cylindrical ring which runs between two opposed rolls. One roll, the back-up roll, is external to the ring and about one-half the diameter of the ring. The other roll, called the work roll, turns within the ring and forms a "horn angle" zone through which the feed is introduced under gradually increasing forces which reach enormous pressures at the converging apex of the angle. Since the ring is supported only by the pressure between the two opposed rolls, it is free to move in accordance with variations in the feed. The floating ring is not driven, but rotates with the work roll by riding on a blanket of the material being processed.

These design features enable the machine to accept a relatively soft material like rubber and apply pressures exceeding 15,000 pounds per inch of roll width, much higher than can be obtained with conventional rubber processing equipment. This type of treatment of wet rubber results in a sheet suitable for drying, having a considerably lower moisture content, even in a single pass, than can ordinarily be achieved with longer processing in other types of equipment. A corresponding reduction is also obtained in the residual electrolyte, soap, and ash content.

No detailed data are yet available on the use of the Stacomizer for the entire washing operation, but work to date shows that rapid washing can best be achieved by mounting a spray close to the pressure area. Through the action of the floating ring, the stock can be automatically carried back through the pressure zone any desired number of passes. In this way, washing and dewatering operations can be carried out simultaneously with the working of the rubber.

The work performed by the Stacomizer on rubber in the wet state has a marked effect on the characteristics of the finished product. Tests were made with a Hycar formulation prepared from wet-Stacomized coagulum, and with the same coagulum which was either dried untreated or given a lengthier processing on a two-roll mill. Over the range of cures used, the Stacomizer-processed compound showed a higher elongation and tear resistance, and a lower modulus than the other compounds. Increased Stacomizer pressure tends to increase the tensile strength of the vulcanizate.

In addition to the washing and dewatering effects noted, the machine also affords a method of obtaining ready feed acceptance of wet coagulum at high capacities, high pressures, and low power inputs with virtually no shear and a minimum of heat build-up. With other types of rubber and other conditions of temperature and working speed, it also appears possible to achieve a breakdown of the polymer to obtain increased plasticity. Effects obtained by wet working are being studied to determine whether the improved properties are due to breakdown of cross-linkages under extreme pressure in the wet state, or to the effect of the working on soap, fatty acid, ash, pH, and other chemical variables that affect cure rate. X-ray diffraction work should throw further light on this subject.

Tests on the Hycar compounds mentioned above showed that part or all of the compounding could be carried out on the Stacomizer itself. By a controlled rate of addition of gum and compounding ingredients, a rolling bank is obtained which promotes rapid dispersion of ingredients at easily controlled temperatures. There is some reason to believe that the machine will afford a continuous mixing method for the preparation of cements, the dispersion of coprecipitated masterbatches, and the treatment of scrap rubber with reclaiming oils.

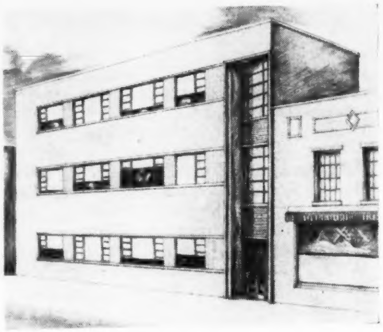
Farrel-Birmingham Co., Inc.

16" x 26" Stacomizer Press

Erecting New Laboratory

Construction of a new office and laboratory building for Phillips Chemical Co.'s Philblack sales division in Akron, O., is now under way. The new building, at 318 Water St., in the heart of downtown Akron, will be approximately 55 by 75 feet in size and three stories high. Phillips will have exclusive occupancy under a 15-year lease.

The first floor will be devoted to the Philblack customer service laboratory, the function of which is to render direct service to customers on technical problems involving the application of Philblack.



Architect's Drawing of Phillips Chemical's New Office and Laboratory Building

Lynn Harbison is manager of the laboratory, which has 10 employes and is now at 330 Maiden Lane, Akron.

The second floor will house the Philblack sales personnel and a small laboratory for studies on the fundamental structure of carbon black. A. W. Oakleaf is Philblack sales manager, and George E. Popp is manager of domestic sales.

The third floor will be used mainly for mechanical equipment and additional office space as required.

A large parking lot will be provided at the rear of the building, which will be adequate for all Phillips employes.

Phillips Chemical is a wholly owned subsidiary of Phillips Petroleum Co., Bartlesville, Okla.

Expediting Production

Bayshore Industries, Inc., Elkton, Md., has increased production of rubber novelties by cutting the curing time in half. This increased output has resulted in reduction of about two-thirds in the selling prices for some items. The firm makes false faces and other rubber novelties by dipping double-face molds into a latex solution and then curing the coating. Experiments with many curing methods showed them to be inadequate for handling the output of the dipping tanks; so it was decided to feed large volumes of hot air into the double-decker curing ovens. In the new arrangements the coated molds on a continuous conveyor pass through the lower part of the oven for initial moisture removal at 160° F. Then the masks are stripped and sent into the top part of the oven for final curing at 300° F. Heated air is supplied by 1,000,000-Btu. automatically controlled, oil fired Counterflo space heaters, manufactured by Dravo Corp. Self-contained fans circulate the air over the heat economizer tubes, around the stainless steel combustion chamber, and through ducts to the ovens.

Dewey & Almy Chemical Co., Cambridge, Mass., has appointed Martin, Hoyt & Milne, San Francisco, Calif., exclusive West Coast sales representative for its organic chemicals division. The firm will handle sales of copolymer resins, polyvinyl acetate emulsions, copolymer latices, and plasticizers, most of which are now being produced in Dewey & Almy's new facilities at its Acton, Mass., plant. Martin, Hoyt & Milne have offices in San Francisco, Los Angeles, Portland, and Seattle.

Goodrich and Gulf Form New Firm

The establishment of a new firm, Goodrich-Gulf Chemicals, Inc., by B. F. Goodrich Co. and Gulf Oil Corp. was announced November 24 by John L. Collyer, Goodrich president and board chairman, and S. A. Swensrud, Gulf president. The new company, whose stock ownership is held equally by the parent organizations, was organized to explore projects in the petrochemical field in which the parent firms have strong complementary interests. It was emphasized, however, that the freedom of the individual companies in the chemical field will not be restricted.

Goodrich-Gulf will have its head office in Pittsburgh, Pa., and a plant site is being obtained at Orange, Tex. Directors of the new firm are: William G. Moore, L. O. Crockett, H. P. Hobart, and Allan B. Sloss, all of Gulf Oil; and John R. Hoover, R. G. Jeter, W. S. Richardson, and Frank K. Schoenfeld, all of Goodrich.

Hercules' Akron Office

To provide more effective service for the rubber industry Hercules Powder Co., Wilmington, Del., on November 19 opened a new branch sales office at 7 W. Bowery St., Akron, O. Hercules produces resins, rosin soap emulsifiers, and hydroperoxides used in the manufacture and compounding of synthetic rubber.

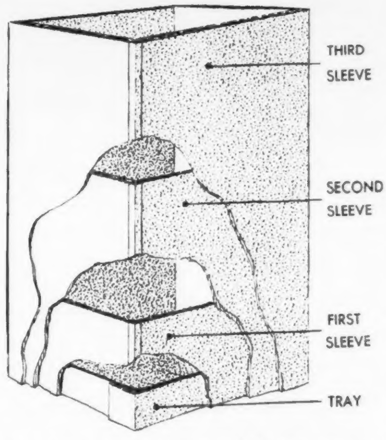
Manager of the Akron office is Clifford S. Reppe, formerly manager of Hercules Powder Co. (Canada), Ltd., Burlington, Ont. Mr. Reppe was engaged in banking in his home town of Portland, Oreg., from 1926 to 1937. Since 1937 he has been with Hercules' paper makers chemical department serving as office manager at Portland, technical representative at Holyoke, Mass., and sales manager at Burlington.

Succeeding Mr. Reppe as manager at Burlington is Raymond M. Bishop, who was assistant manager.

Shipping Container for Rubber Bales

A new corrugated shipping container which combines up to 32 bales of synthetic rubber into a compact unit has been developed by Gaylord Container Corp., St. Louis, Mo. Previously each 75-pound bale was packaged in a multi-wall bag, and 21 of these bags were arranged so that the load could be handled by a lift truck. The new package increases the weight per unit load and the load height, but reduces floor area per unit load and simplifies handling and storage.

The Gaylord container is corrugated board and requires no reinforcing tapes, strapping, or wire. The container consists of three telescoping sleeves. The first sleeve has a base tray which is filled with rubber bales. When this tray is full, a second and higher sleeve is slipped over the sides of the bottom sleeve to provide more bale space. Similarly, the third sleeve is added, and bales are stacked inside to capacity. The greatest amount of container strength is developed where internal pressure is greatest. The container has four walls at the bottom, where maximum pressure is developed, and one wall at the top where pressure



Cut-Away View of Gaylord Container for Synthetic Rubber Bales

is at a minimum. An ordinary blade type of fork will slip under the filled container, and repeated use of fork truck presents no problem of container injury. Users of the new container are said to report savings of about 20 man-hours in unloading a single boxcar of rubber.

Industrial Relations Department Expands

The growing importance of employe and public relations matters has made it desirable for Midwest Rubber Reclaiming Co., East St. Louis, Ill., and Barberton, O., to expand the industrial relations department with the addition of Harold J. Baldwin, who joined Midwest on October 15. Mr. Baldwin comes from Seiberling Latex Co., of Barberton, O., where he had charge of industrial relations.

Baldwin has engaged in safety work, job and wage analysis, contract negotiation and administration, and other personnel matters as a consultant and also as a full-time employe. At Midwest, he will assist Robert M. Boyles, director of industrial relations, in the administration of various phases of industrial relations matters.

Opens Executive Office

Kentucky Synthetic Rubber Corp. has established a small executive office at 346 Post Road East, Darien, Conn. The company, made up of 19 non-tire rubber manufacturers, operates one of the government-own synthetic rubber plants at Louisville, Ky. The Darien office will be headed by Henry F. Palmer, vice president and formerly plant manager. Operating headquarters will contine at the Louisville plant. According to the company president, Thomas Robins, Jr., Darien was selected as the best location for the new office because of its central location to most of the participating firms, since 17 have headquarters in Mid-Atlantic States.

W. H. Spreen has been appointed midwestern district sales manager for Heyden Chemical Corp., 342 Madison Ave., New York 17, N. Y., with headquarters at the Chicago branch office. Mr. Spreen has been manager at Detroit since 1945.

Conveyor System to Unload Ore

A giant conveyor system, designed and installed by Hewitt's Robins Engineers Division will speed up the transfer of incoming ore from ships to railroad cars. Part of the expansion and modernization of the Canton Railroad's facilities in Baltimore harbor, the conveyor system will speed ore from ship to shore at the rate of 3,000 tons an hour. The system features two 48-inch wide belt conveyors totaling more than 1,600 feet in length, with each designed to handle 1,000 tons an hour. From the main belt, the ore will be transferred to a second belt going up a 16-degree incline to a weighing station 100 feet high. The uphill belt will operate at a speed of 615 feet a minute, as compared with 545 feet a minute for the longer belt.

Herbert Fineberg, since 1948 chief chemist of Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y., has been promoted to director of research, with headquarters at Williamsport, Pa. Dr. Fineberg previously had been a research chemist for Eastman Kodak Co.; chief chemist for Connecticut Hard Rubber Co.; and director of Geral Chemical Co.

CANADA

To Prosecute Rubber Firms

The Canadian Government, through Justice Minister Stuart Garson, announced on November 7 that it has decided to prosecute rubber companies alleged to have participated in illegal price fixing combines. The Rubber Association of Canada and 19 rubber companies were originally named in a report made public last June, alleging the existence of six combines in the rubber industry. Mr. Garson stated that the number of companies to be prosecuted will depend on evidence obtained under search warrants recently issued against the accused parties.

The rubber combines will be the first cases to be tried under the government's new anti-combines laws which became effective November 1. Under this law, all ceilings on fines are removed; the amount of the fine is left to the discretion of the presiding judge at the trial. Previously the fine ceiling was \$25,000 against a guilty corporation, and \$10,000 plus two years in prison against an individual.

Two Toronto lawyers, T. N. Phelan and D. D. Carrick, have been selected as prosecuting attorneys in the rubber case. According to Mr. Garson, the first step in the prosecutions will be the examination of the charges by the grand jury to determine whether trials will follow. The rubber combine inquiry, launched in September, 1947, covers the following six divisions of the industry: mechanical rubber goods; tires and tubes; accessories and repair materials; heels and soles; footwear; and rubber clothing.

The companies and groups named in the rubber report last June, as well as the divisions where illegal price fixing is

alleged to take place, follow: Rubber Association of Canada, all groups except mechanicals; Dominion Rubber Co., Ltd., B. F. Goodrich Rubber Co. of Canada, Ltd., and Gutta Percha & Rubber, Ltd., each in mechanicals, tires and tubes, footwear, and accessories; Dunlop Tire & Rubber Goods Co., Ltd., and Goodyear Tire & Ruber Co. of Canada, Ltd., each in mechanicals, tires and tubes, and accessories; Miner Rubber Co., Ltd., footwear, heels and soles, and clothing; Barrington Rubber & Plastics, Ltd., mechanicals and clothing; Firestone Tire & Rubber Co. of Canada, Ltd., and Seiberling Rubber Co. of Canada, Ltd., each in tires and tubes and accessories; Kaufman Rubber Co., Ltd., footwear and clothing; G. I. Griffith & Sons, Ltd., and Viceroy Mfg. Co., Ltd., each in mechanicals; General Tire & Rubber Co. of Canada, Ltd., tires and tubes; Acton Rubber, Ltd., Cambridge Rubber, Ltd., and Northern-Woodstock Rubber, Ltd., each in footwear; Panther Rubber Co., Ltd., and Holtite Rubber Co. of Canada, Ltd., each in heels and soles; and Canadian General-Tower, Ltd., in clothing.

Opens New Plant

Canadian Sponge Co., Ltd., marked the official inauguration of its new $3,000,000 plant at Waterville, P.Q., on November 6 with the cutting of a wide rubber band instead of the traditional ribbon. The plant site was originally chosen more than two years ago, and one-third of the town's population is now employed by the plant. Fred Daley, Jr., is president of the firm, which manufactures sponge rubber weatherstripping for auto doors, rafts, tubings, and other products.

Rubber Stocks Up; Use Down

Combined Canadian stocks of rubber—natural, synthetic, and reclaim—on August 31, increased to 13,776 long tons from 12,496 on the same date last year; while the month's consumption fell to 4,858 long tons from 5,869, the Bureau of Statistics reported. Domestic production of synthetic and reclaim rose to 6,524 long tons from 5,513.

Stocks of natural rubber at the end of August declined to 4,491 long tons from 6,499 a year ago; reclaim, to 1,367 from 2,360; while stocks of synthetic were up sharply to 7,918 long tons from 3,637. Consumption of natural rubber in August decreased to 1,984 long tons from 2,832; reclaim, to 777 from 1,093; but there was a gain in the consumption of synthetic rubber to 2,097 long tons from 1,944.

Domestic production of synthetic rubber totaled 6,238 long tons, compared with 5,036 in the corresponding month of 1951. Output of reclaim rubber decreased to 286 long tons from 477.

Combined stocks of rubber on September 30 reached 14,268 long tons, against 13,445 a year earlier. Consumption in September was practically unchanged at 6,578 long tons, against 6,565; while domestic production of synthetic and reclaim was 19% higher at 7,117 long tons, compared with 5,969.

Month-end stocks of natural rubber declined to 4,745 long tons from 6,485 a year earlier; reclaim, to 1,359 from 2,548; while inventories of synthetic advanced sharply to 8,164 long tons from 4,412. Consumption of synthetic rubber increased in September to 2,622 long tons from 2,280; reclaim, to 1,148 from 1,105; while natural declined to 2,808 long tons from 3,180.

Domestic production of synthetic and reclaim rubber moved higher; the former rose to 6,702 long tons from 5,568 in September last year, and the latter to 415 from 401.

Gutta Percha & Rubber, Ltd., Toronto, Ont., recently manufactured a conveyor belt 115¼ inches wide. Believed to be one of the widest conveyor belts ever made, the unit is one of three made for the Dominion Engineering Works, Ltd., for use in the sintering plant of the lead smelter at Consolidated Mining & Smelting Co. of Canada, Ltd., Trail, B.C. The belt will be finished off in the field with a vulcanized splice.

OBITUARY

Randolph Brown

RANDOLPH FLETCHER BROWN, senior vice president of Bill Brothers Publishing Corp., which publishes India Rubber World and *Tires Service Station*, died at his home in Lynne, Conn., on November 3 at the age of 57.

Mr. Brown, who was a graduate of the University of Wisconsin, Class of 1917, joined the Bill organization as a salesman in the Midwest office immediately after service as an officer in the United States Army in World War I.

In 1919 he came to the New York office as director of *Tires Service Station*, which was founded that year. Assuming the general management of that publication, he directed it until 1931, when he became publisher of *Premium Practice & Business Promotion*, a position he occupied until his death. During his many years' connection with these publications he was widely known for his grasp of business and industry and was a potent factor in their development.

Mr. Brown is survived by his widow, Mrs. Hester Bill Brown; two sons, Randolph Fletcher Brown Jr., and Bill Brown; a grandson, Randolph Fletcher Brown, III; and a sister, Agnes Fletcher Brown.

Funeral services were held in the Congregational Church, Hamburg, Conn., on November 5, with interment in Pleasant View Cemetery, Lyme.

Joseph G. Swain

JOSEPH G. SWAIN, consulting manager of the rim division of the Goodyear Tire & Rubber Co., Akron, O., died October 24 in an Akron hospital, where he had been undergoing treatment for two weeks, after several months of ill health.

Mr. Swain had been general manager of the Goodyear rim division for 22 years until June, 1952, when he relinquished those duties and became consulting manager.

Born March 27, 1879, in Indianapolis, Ind., Mr. Swain was educated in local public schools and Purdue University, from which he was graduated with a degree in electrical engineering.

He was general superintendent of the St. Joseph, Mo., Railway & Light Co., from 1910 to 1913, then helped build and put into operation the Cleveland-Painesville Electric Railway System. From 1914 to 1918 he was general superintendent of the Northern Ohio Traction & Light Co., Akron.

Mr. Swain entered the rim manufacturing business in 1918, as vice president and general manager of the Firestone Steel Products Co., Akron, where he remained until 1929. He joined Goodyear in 1930 as manager of rim sales and was appointed general manager of the rim division in 1933.

He belonged to the Society of Automotive Engineers, the Automotive & Aviation Parts Manufacturers' Association, Masonic organizations, and Portage Country Club.

Services were held October 27 at the Church of Our Saviour, followed by interment in Rose Hill Cemetery.

Mr. Swain leaves three daughters and a sister.

Robert H. Ellis

ROBERT HARKNESS ELLIS, manager of the electrical, service and construction departments of United Engineering & Foundry Co., Pittsburgh, Pa., died of a heart attack November 1.

The deceased was born July 17, 1893, in Pittsburgh.

His association with United started in the machine shop of the Frank-Kneeland plant while he was still attending the University of Pittsburgh from which he received a B.S. degree in electrical engineering in 1918.

During World War I Mr. Ellis served in the United States Army and at the end of the war worked for a short time with General Electric Co. and Westinghouse Electric Corp., before starting again with United in 1927 as an electrical engineer and in 1944 assumed the managerial position he held until his death.

Robert Ellis was a member of the Sixth Presbyterian Church, Butler Country Club, Pittsburgh Athletic Association, and the Association of Iron & Steel Engineers.

Funeral services were held November 4 in Pittsburgh, followed by burial in Homewood Cemetery.

Survivors include the widow, one son, and two sisters.

W. Troy McWhorter

W. TROY McWHORTER, sales representative in the dyestuff department of Calco Chemical Division, American Cyanamid Co., Charlotte, N. C., died November 9 while attending a meeting in Boston.

Mr. McWhorter was born April 17, 1903. He received his B.S. degree in textile engineering from Georgia School of Technology in 1924.

During World War II the deceased served as a major in the United States Army Artillery.

He was a member of Delta Tau Delta, Poinsett Club and the American Association of Textile Chemists & Colorists.

Burial services were held in Atlanta, Ga., November 12.

The widow survives.

NEWS ABOUT PEOPLE

Loring Studios

Robert E. Sherman

Robert E. Sherman, sales engineer, has been named by OPW Corp., Cincinnati, O., manufacturer of valves, fittings, and assemblies for handling hazardous liquids, its first resident factory representative in the northeast district. Sherman's territory comprises Connecticut, Main, Massachusetts, New Hampshire, Vermont, upper New York State, Toronto, and Montreal. He will serve as adviser to sales representatives and jobbers.

S. E. (Sid) Shepard has been named sales manager of the automotive replacement division, Thermoid Co., Trenton, N. J. Mr. Shepard has been engaged in the automotive replacement business for more than 20 years, beginning at the Multibestos Co., as a sales correspondent and later becoming sales manager, He served as director of replacement sales of Raybestos Division, Raybestos-Manhattan, Inc., after that firm purchased Multibestos in 1935, and in 1947 was made vice president and general sales manager of Asbestos Mfg. Co., a Thermoid subsidiary at Huntington, Ind.

Randolph B. West, Jr., has been named assistant factory personnel manager for Goodyear Tire & Rubber Co., replacing Hugh Hilliard, now manager of industrial relations for the new Goodyear Atomic Corp. West, who recently returned from an assignment as personnel manager of the company's plant in Luxembourg, will be responsible in his new position to N. G. Ball, factory personnel manager. West, overseas nearly three years, has 18 years with Goodyear. He started on the company's training squadron, became an inspector, later was in the efficiency department, was transferred to Jackson, Mich., in 1940, and returned to Akron after two years to become manager of the labor department at Plant 2. West was next appointed personnel manager at the St. Marys, O., plant in 1943, continuing there until 1948, when he was recalled to Akron to become assistant to F. J. Carter, director of personnel. The following year West transferred to foreign operations, prior to his Luxembourg post.

Ernest O. Ohsol has joined Pittsburgh Coke & Chemical Co. Pittsburgh, Pa., director of chemical engineering and will be responsible for economic and engineering evaluations of major chemical projects and will supervise development of process design and specifications. Dr. Ohsol was formerly at General Electric Co., Pittsfield, Mass., as manager, new product development laboratory, and before that had been with Esso Research Center of Standard Oil Development Co.

Ernest O. Ohsol

Robinson Ord has been named assistant to Vice President Felix N. Williams, member of Monsanto's executive committee. Ord will assist in the company's program of sales coordination. He has been with Monsanto since 1929, starting as sales correspondent and export manager. In 1945, after five years as assistant general sales manager for the organic chemicals division, he was appointed its general manager of sales.

James D. Casey has been elected vice president in charge of engineering of Bolta Co., Lawrence, Mass., manufacturer of Boltaflex plastic upholstery material and various other plastic products. Mr. Casey has been associated with the Bolta organization for more than 15 years in the engineering department. As chief engineer, he has supervised the development and installation of machinery at Bolta. He was in charge of installing all equipment in the extensive new Boltaflex plant and was also instrumental in developing the printing and embossing techniques used in manufacturing Boltaflex. In many instances, he has developed special machinery not available on the open market.

Thomas D. Cabot, vice chairman of the board of directors and executive vice president of Godfrey L. Cabot, Inc., Boston, Mass., was elected a board member of the National Industrial Conference Board for a term of one year at the three hundred and thirty fourth meeting of the Board on October 23, at the Waldorf-Astoria Hotel, New York. Mr. Cabot was a board member from 1946-1951.

Pogue's Studio

Roy W. Gronauer

Roy W. Gronauer has been named assistant general sales manager of OPW Corp., Cincinnati, O. Gronauer, who joined the firm in 1949 as sales engineer, will assist the director of sales in the supervision field representatives, and district managers, and will coordinate sales promotion and advertising.

Carroll C. Parker has been appointed assistant manager of grinding wheel sales for United States Rubber Co.'s mechanical goods division, with headquarters at the Fort Wayne, Ind., plant. For six years Mr. Parker has been doing sales and service work for the grinding wheel division in northeastern Ohio and western New York State. Before that he was a production engineer and was also with the development department.

Fred W. Fraley, a vice president of Diamond Alkali Co., Cleveland, O., who has been "on loan" to the United States Government, returned to Diamond from Washington on December 15. Mr. Fraley served as assistant administrator in charge of the Chemical, Rubber & Forest Products Bureau of the National Production Authority, Department of Commerce. He had joined NPA on March 31 as an assistant director of the chemical division under the rotation principle followed by NPA whereby industry executives are recruited to serve in key administrative positions for temporary periods. At Diamond, Mr. Fraley's duties will involve special assignments, including relations of the company with the government and the chemical industry as a whole.

Wilfred J. Mohr has been appointed manufacturing manager of Southern Latex Corp., Austell, Ga., in charge of laboratory and plant. Mr. Mohr first worked for Minnesota Mining & Mfg. Co. on rubber dispersions and adhesives in its St. Paul research laboratory and subsequently in the Detroit laboratory. Next (in 1945) he went to Flinkote Co. and was placed in charge of its rubber laboratory in 1947. His most recent position was technical sales director of Rubber & Asbestos Corp.

W. G. "Guy" Hoffman has been appointed West Coast representative, with offices in San Mateo, Calif., by The Aetna-Standard Engineering Co., Pittsburgh, Pa. In January, 1936, he was appointed superintendent of construction of the Gary Sheet Mill, Gary, Ind., and in July of the same year he became chief engineer there. Mr. Hoffman was made division superintendent of the Gary tin mill division in January, 1939, and in March, 1948, he went to the Pittsburgh office of Carnegie-Illinois Corp., where he was placed in charge of properties. In November, 1950, he was made chief of staff of operation consulting engineering bureau and retired in 1951, completing a 50-year service record with U. S. Steel.

Richard Meehan, executive vice president of H. Muehlstein & Co., Inc., New York, N. Y., has been named a director of the National Association of Waste Material Dealers until March 24, 1953, to complete the remainder of this year's portion of the late William McCauley's term. Mr. Meehan has been with Muehlstein since 1932. In 1942 he was named secretary, in 1948, vice president, and in July, 1952, executive vice president. Prior to his appointment to the New York office in 1941, he had been in the firm's Boston and Akron offices.

H. E. Anderson has been appointed assistant sales manager of knitting and tufting yarns for United States Rubber Co.'s textile division and will assist in sales of combed, carded and synthetic yarns. His headquarters are at the company's offices in Chattanooga, Tenn., where he has been serving in a sales capacity.

Harry J. Carroll, a member of Goodyear Tire & Rubber Co.'s traffic department since 1910 and its director of traffic for the past two years, has been elected a national vice president of the National Defense Transportation Association. He will represent American industry in the organization, which is composed also of officials of railroads, truck, bus and air lines, and water transportation, freight forwarding, and warehousing and storage companies.

Earl H. Schaub, since June, 1951, Boston division sales manager of The General Tire & Rubber Co., has been promoted to the position of manager, new distribution, with headquarters in Akron, home of General Tire. Schaub, in rubber industry sales work 19 years, joined General Tire's sales organization in 1938 as a territory sales manager. He next headed the divisional sales operations for General's Buffalo, Denver, and Boston divisions. In his new capacity Schaub will be responsible for further strengthening the distribution of all the company's products in the major markets of the United States through independent tire dealers.

William S. Rea, general sales consultant for United Carbon Co., Inc., Charleston, W. Va., has been transferred from offices in the Empire State Bldg., New York, N. Y., to San Francisco, Calif., where he will act in the same capacity. Mr. Rea will look after the interests of the company through L. H. Butcher Co., carbon black sales representative for United Carbon on the Pacific Coast.

Hans Stauffer

Hans Stauffer has been elected executive vice president of Stauffer Chemical Co., 420 Lexington Ave., New York, N. Y. Mr. Stauffer has been vice president and general manager of the company since 1941.

W. D. Hodges, Colonial Bldg., 100 Boylston St., Boston, Mass., has been appointed New England representative for Brown Chemicals, 15 Moore St., New York 4, N. Y., which is engaged in the manufacturing, chemical processing, importing, and distributing of vegetable oils and vegetable oils specialties.

Paul L. Tracy has been appointed comptroller and assistant treasurer of Firestone Steel Products Co. Mr. Tracy joined the Firestone organization in 1931 in the stores operating division and was placed in charge of district auditing in 1934. He became comptroller of Nebraska Defense Corp. in 1942 and was stationed at the ordnance plant at Fremont, Neb. Returning to Akron in 1944, he handled special assignments for the comptroller and in 1945 headed the contract termination department. Since 1950 he has been organizing and developing the pens on department.

John L. Hammer, Jr., has been appointed director of marketing for Monsanto Chemical Co.'s organic chemicals division, St. Louis, Mo. Hammer formerly was vice president in charge of sales and a director of Smith, Kline & French Laboratories.

Harmon H. Gillman has been appointed technical director of Bishop Mfg. Corp., Cedar Grove, N. J., manufacturer of electrical insulating tapes and compounds. Mr. Gillman, who will continue the development of existing products plus a new line of rubber and plastic products, has been associated with the rubber industry for the past 14 years. His last position was manager of the materials division of Gates Rubber Co., where he served in various executive capacities for the past 12 years. Mr. Gillman was chairman of the membership committee of the Colorado Section, A. C. S., and also belongs to the American Institute of Chemical Engineers, Rocky Mountain Section.

L. A. Melsheimer, formerly in charge of the pigment department technical service laboratory, has been assigned the post of manager of technical promotion pigment department, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. Mr. Melsheimer will supervise the preparation and distribution of technical literature relating to the application of pigments.

FINANCIAL

Allied Chemical & Dye Corp., New York, N. Y. First nine months, 1952: net income, $29,709,142, equal to $3.35 each on 8,856,396 common shares, against $29,835,323, or $3.37 a share, in the like period of 1951.

American Cyanamid Co., New York, N. Y., and subsidiaries. Nine months ended September 31, 1952: net earnings, $16,931,-763, equal to $1.95 a common share, contrasted with $30,231,096, or $3.51 a share, in the 1951 period: net sales, $271,733,740, against $296,630,302.

American Hard Rubber Co., New York, N. Y. Forty weeks to October 5, 1952: net earnings, $124,621, equal to 14¢ a share, contrasted with $679,756, or $2.17 a share, in the 40 weeks to October 7, 1951.

Armstrong Cork Co., Lancaster, Pa. First three quarters, 1952: net income, $6,426,000, equal to $4.04 a common share, against $6,916,032, or $4.39 a share, a year earlier.

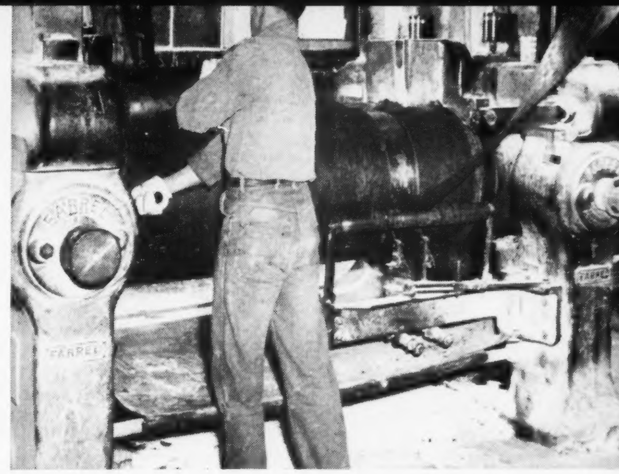
Belden Mfg. Co., Chicago, Ill. Nine months ended September 30, 1952: net earnings, $687,752, equal to $2.15 a common share, against $891,298, or $2.78 a share, in the 1951 period.

Borg-Warner Corp., Chicago, Ill., and subsidiaries. First three quarters, 1952: net profit, $13,701,554, equal to $5.54 a common share, compared with $15,448,265, or $6.43 a share, in the 1951 quarters; net sales, $253,698,807, against $295,350,-299.

Brunswick-Balke-Collender Co., Chicago, Ill. January 1-September 30, 1952: net earnings, $420,767, equal to 73¢ a common share, against $735,496, or $1.43 a share, a year earlier.

Circle Wire & Cable Corp., Maspeth, L. I., N. Y. Nine months to September 30: net profit, $1,644,135, equal to $2.19 a share, against $1,535,181, or $2.05 a share, a year earlier.

Crown Cork & Seal Co., Inc., Baltimore, Md., and wholly owned domestic subsidiaries. First nine months, 1952: net income, $188,249 equal to 68¢ a preferred share, contrasted with $2,964,902, or $2.11 a common share, in the 1951 months; net sales, $79,427,419, against $82,485,400.



IDEAL FOR ALL STOCKS. Besides costing less than any of the five process aids it replaced, and its other advantages, Sundex-53 mixes easily with natural, GR-S and reclaim stocks. In the picture above it is shown being added to a batch of heel stock.

QUICKER, MORE THOROUGH PLASTICIZATION. By using Sundex-53 only, the company has been able to produce a more uniform finished product. Quality heels will be blanked out of the stock leaving this warm-up mill and entering the cutter.

SINGLE GRADE OF SUNDEX REPLACES 5 PROCESS AIDS

Some years ago, as an economy step, the Beebe Rubber Company, Nashua, N.H., tried to reduce the number of process aids it used. Five different types were being employed in the processing of natural, GR-S and reclaim stock for heels, soles and soling slabs.

A Sun representative who had been called in recommended replacing all five process aids with Sundex-53 and the company took his advice. This one "general purpose" rubber-process aid has more than just simplified inventories and purchasing; *it has proved advantageous in other respects besides.* Because of the way it is refined, it works as well with light colored stock as with dark. It quickly breaks down reclaims and does not over-process natural rubber and GR-S polymers. It costs less than the process aids it replaced, and has eliminated the potential danger of mixing errors.

For more information about Sundex-53 and other Sun Rubber-Process Aids, write to us for the booklet "Processing Natural Rubber and Synthetic Polymers," offered in coupon below.

ECONOMIES ALL ALONG THE LINE. Sundex-53 not only costs less than any of the five products it replaced, but it also saves money through simplification of ordering and stocking. The operator shown above is setting up a mold to vulcanize heels.

SUN OIL CO., Dept. RW-12, Philadelphia 3, Pa.

I am having trouble that may be due to inadequate process aids. I should like to have: ☐ the services of a Sun representative; ☐ the booklet "Processing Natural Rubber and Synthetic Polymers."

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Company________________

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TECHNICAL ASSISTANCE AVAILABLE. Sun's engineers are at your service for consultation on process aid and lubrication matters. It will pay you to utilize the broad experience they have gained in solving a wide variety of problems in many different types of industry.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO ®

Columbian Carbon Co., New York, N. Y. First nine months, 1952: net income, $2,906,655, equal to $1.80 a share, compared with $3,551,878, or $2.20 a share, in the corresponding period of 1951.

DeVilbiss Co., Toledo, O. Nine months ended September 30, 1952: net earnings, $651,812, equal to $2.17 a share, against $705,680, or $2.35 a share, in the corresponding months of 1951.

Dewey & Almy Chemical Co., Cambridge, Mass. Nine months to September 30, 1952: net profit, $230,730, equal to 25¢ a common share, contrasted with $1,043,500, or $1.14 a share, in the 1951 months; net sales, $20,597,899, against $22,052,698.

Flintkote Co., New York, N. Y., and subsidiaries. Forty weeks ended October 4, 1952: net profit, $3,680,294, equal to $2.71 a common share, compared with $4,455,856, or $3.33 a share, in the like period last year; net sales, $64,334,310, against $67,705,053.

General Cable Corp., New York, N. Y. First nine months, 1952: net income, $3,618,489, equal to $1.61 a share, against $3,679,997, or $1.62 a share, in the prior year's period.

General Electric Co., Schenectady, N. Y. First nine months, 1952: consolidated net income, $94,750,000, equal to $3.28 each on 28,845,927 capital shares, compared with $85,936,000, or $2.98 a share, in the 1951 period; sales, etc., $1,813,490,000, against $1,694,084,000.

General Motors Corp., New York, N. Y. Nine months to September 30, 1952: consolidated net earnings, $387,030,986, equal to $4.32 a common share, compared with $372,790,913, or $4.14 a share, in the 1951 period; net sales, $5,563,916,214, against $5,602,601,800.

Goodall-Sanford, Inc., Reading, Mass. Twelve weeks ended September 30, 1952: net loss, $225,674, contrasted with net profit of $511,172, equal to 85¢ a share, in the like period last year.

Johnson & Johnson, New Brunswick, N. J. Nine months to September 30, 1952: net profit, $6,220,000, equal to $2.91 a common share against $6,747,000 or $3.15 a share, a year earlier.

Minnesota Mining & Mfg. Co., St. Paul, Minn. Nine months ended September 30, 1952: net profit, $11,442,337, equal to $1.39 a share, against $11,427,754, or $1.39 a share, a year earlier; sales, $133,778,460, against $126,810,666.

Mount Vernon-Woodberry Mills, Inc., New York, N. Y. January 1-September 30, 1952: net profit, $2,329,442, equal to $3.62 a share, compared with $3,154,920, or $4.91 a share, in the 1951 months.

National Lead Co., New York, N. Y. January 1-September 30, 1952: net income, $15,344,581, equal to $1.35 a share, against $16,387,022, or $1.45 a share, in the same period last year.

B. F. Goodrich Co., Akron, O. January 1-September 30, 1952: net earnings, $23,008,681, equal to $5.36 a common share, compared with $24,500,272, or $5.75 a share, in the 1951 period; net sales, $453,938,658, against $479,956,064.

Goodyear Tire & Rubber Co., Akron, O. First nine months, 1952: consolidated net profit, $27,609,612, equal to $6.13 a share, compared with $27,682,020, or $6.18 a share, in the first nine months of 1951; consolidated net sales, $853,933,430, against $816,828,231.

Hewitt-Robins, Inc., Stamford, Conn. January 1-September 30, 1952: net income, $668,377, equal to $2.34 each on 286,051 shares, against $770,867, or $2.77 each on 278,714 shares, in the corresponding period of 1951: net sales, $27,583,166, against $26,254,814.

Byron Jackson Co., Los Angeles, Calif. First nine months, 1952; net income, $1,011,550, equal to $1.95 a common share against $1,065,486, or $2.01 a share, in the corresponding months of 1951.

National Rubber Machinery Co., Akron, O. Nine months ended September 30, 1952: net earnings, $471,000, equal to $2.68 a share, compared with $487,495, or $3.16 a share, in the 1951 months.

New Jersey Zinc Co., New York, N. Y. Nine months to September 30, 1952: net earnings, $10,035,454, equal to $5.12 a share, contrasted with $6,872,415, or $3.51 a share, in the corresponding period of the previous year.

Pittsburgh Plate Glass Co., Pittsburgh, Pa. First three quarters, 1952: net income, $26,617,605, equal to $2.94 a share, compared with $22,732,227, or $2.52 a share, in the 1951 period; sales, $293,964,356, against $310,471,601.

O'Sullivan Rubber Corp., Winchester, Va. Nine months ended September 30, 1952: net income, $114,222, equal to 23¢ a share, against $172,656, equal to 38¢ a share, in the 1951 months.

Pittsburgh Coke & Chemical Co., Pittsburgh, Pa. First nine months, 1952: net profit, $1,426,000, equal to $1.38 a share, contrasted with $2,439,00, or $2.94 a share, in the similar period last year.

Raybestos-Manhattan, Inc., Passaic, N. J. Nine months to September 30, 1952: net earnings, $2,131,273, equal to $3.39 a common share, against $3,347,466, or $5.33 a share, a year earlier.

Rome Cable Corp., Rome, N. Y. Six months ended September 30, 1952: net profit, $1,058,000, equal to $2.17 a share, contrasted with $729,000, or $1.56 a share, in the corresponding period of 1951.

Sheller Mfg. Corp., Portland, Ind. Nine months ended September 30, 1952: net earnings, $1,642,367, equal to $1.72 a common share, compared with $2,412,955, or $2.53 a share, in last year's months.

Swan Rubber Co., Bucyrus, O. Nine months ended September 30, 1952: net profit, $753,092, equal to $1.18 a share, compared with $1,019,250, or $1.59 a share, a year earlier.

Union Asbestos & Rubber Co., Chicago, Ill. Nine months to September 30, 1952: net income, $471,583, equal to 99¢ a share, against $539,704, or $1.13 a share, in the preceding year's months.

United Carbon Co., Charleston, W. Va. First nine months, 1952: net income, $2,582,971, equal to $3.25 a share, compared with $2,703,972, or $3.40 a share, in the previous year's months.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Armstrong Cork Co.	Com.	$0.65	Dec. 1	Nov. 7
	$3.75 Pfd.	0.93¾ q.	Dec. 15	Dec. 1
	$4.00 Pfd.	1.00 q.	Dec. 15	Dec. 1
Bork-Warner Corp.	Com.	1.00 q.	Dec. 1	Nov. 18
	Pfd.	0.87½ q.	Jan. 2	Dec. 17
Brown Rubber Co., Inc.	Com.	0.25	Dec. 1	Nov. 18
Canadian Tire Corp., Ltd.	Com.	0.15 q.	Dec. 1	Nov. 20
Collins & Aikman Corp.	Com.	0.40	Dec. 1	Nov. 18
E. I. du Pont de Nemours & Co., Inc.	Com.	1.00 yr.-end	Dec. 13	Nov. 24
	$4.50 Pfd.	1.12½ q.	Jan. 24	Jan. 9
	$3.50 Pfd.	0.87½ q.	Jan. 24	Jan. 9
Firestone Tire & Rubber Co.	Com.	0.50 extra	Dec. 1	Nov. 14
	Pfd.	1.12½ q.	Dec. 1	Nov. 14
General Tire & Rubber Co.	Com.	0.50 q.	Nov. 28	Nov. 18
Goodall-Sanford, Inc.	Com.	0.37½	Dec. 1	Nov. 15
	6% Pfd.	0.75 q.	Dec. 1	Nov. 15
	4% Pfd.	1.00 q.	Dec. 1	Nov. 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	1.00	Dec. 31	Dec. 10
	4% Pfd.	0.50 q.	Jan. 31	Jan. 9
Johnson & Johnson Co.	Com.	0.25 q.	Dec. 11	Nov. 24
Link-Belt Co.	Com.	0.60 q.	Dec. 1	Nov. 3
Minnesota Mining & Mfg. Co.	Com.	0.25 q.	Dec. 12	Nov. 21
	Pfd.	1.00 q.	Dec. 12	Nov. 21
Okonite Co.	Com.	Stk. 5%	Dec. 1	Nov. 17
Phelps Dodge Corp.	Com.	0.42½ extra	Dec. 10	Nov. 21
		0.65	Dec. 10	Nov. 21
Sheller Mfg. Corp.	Com.	0.30 q.	Dec. 12	Nov. 18
United Elastic Corp.	Com.	0.60 q.	Dec. 10	Nov. 17
		Stk.*	Dec. 17	Nov. 17
United States Rubber Co.	Com.	0.50	Dec. 10	Nov. 21
	8% 1st Pfd.	2.00	Dec. 10	Nov. 21
Westinghouse Air Brake Co.	Com.	0.40 yr.-end	Dec. 15	Nov. 28
		0.40 q.	Dec. 15	Nov. 28
S. S. White Dental Mfg. Co.	Com.	Stk. 3%	Nov. 14	Nov. 3
		0.37½ q.	Nov. 14	Nov. 3

*A stock dividend of one share for each ten held.

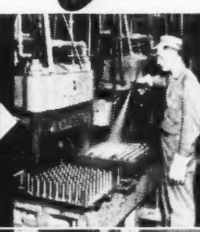
DOW CORNING mold lubricants make mandrels come CLEAN

Moe Muscles doesn't know his own strength since the company switched to Dow Corning silicone release agents for mandrels. Inspector Mike is happy, too, because tubing strips cleaner than ever before. High interior surface finish and precise I.D.'s are the order of the day, while scrap has dwindled to the vanishing point. Mandrels stay clean from 5 to 20 times longer, too.

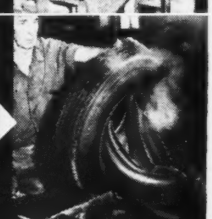
That's because Dow Corning silicones can't break down to form a carbonaceous build-up on mandrel or mold surfaces. Cleaning schedules are reduced, service life is lengthened, and maintenance costs are cut by as much as 80%.

For easier release and better quality in your own pressroom, specify Dow Corning silicone mold release agents: Emulsions for molds, mandrels and curing bags; Fluid for green carcasses and for bead and parting line release.

Deep Cavity Molds



Curing Bags



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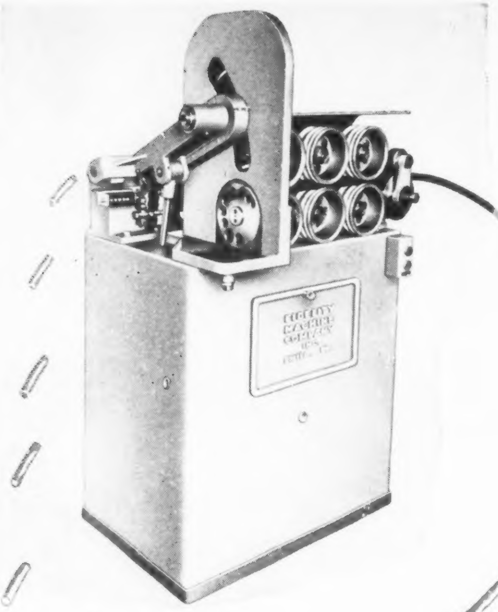

Cut Hose

automatically at 45 pieces a minute with NEW *Fidelity* Hose Measuring and Cutting Machines

Revolutionary in design, the Fidelity Automatic Hose Measuring and Cutting Machine enables you to reduce labor costs, improve quality, boost output, prevent waste, and save floor space.

The Fidelity feeds, measures, counts and *cuts* hose automatically to any preset length and holds the closest tolerances. It takes only a moment to change length or diameter. One operator can handle several of these new Cutting Machines. No special skills are required and the operation is 100% *safe.*

Let us send you full details on this new labor-saving development for cutting rubber. Write today for Catalog H.

Manufacturers of intricate precision machinery since 1911.

FIDELITY MACHINE COMPANY INC.

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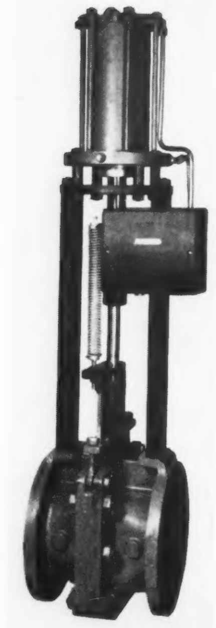
New Machinery

Cylinder Piston Positioner



Poweractor Positioner Insalled on Cylinder Operated Valve

ACCURATE positioning of cylinder operated devices is the function of the new Poweractor positioner announced by Foxboro Co., Foxboro, Mass. Operating from a standard 3-15 psi. pneumatic controller signal, the device applies a high-pressure pneumatic differential across a cylinder piston as required by the controller. Designed especially for use with the Foxboro Stabiload Cylinder, the Poweractor will position equipment requiring load stroke and power, such as large-size control valves, dampers, variable-speed drives, etc., through pneumatic cylinder or springless diaphragm operating mechanisms.

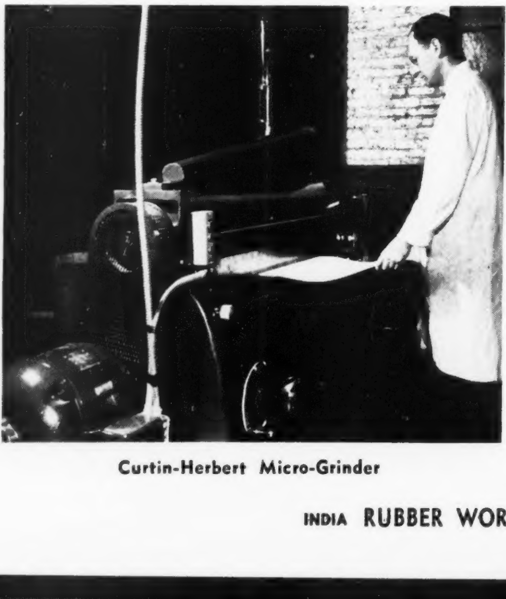
The unit is a force balance-type instrument connected to the cylinder piston rod through a bracket and spring assembly. Every change in the controller signal produces a corresponding position change of the piston. Capable of handling up to a 150-psig. air supply, depending on cylinder rating, the Poweractor responds to a change in signal pressure of 0.25% of range and positions a piston with 1% of its total stroke under normal loading conditions.

Surface Grinder

THE Curtin-Herbert Micro-Grinder, a new surface grinder that will face wide web sheets of rubber, plastic, leather, felt, cork, or metal has been announced by Curtin-Herbert Co., Gloversville, N. Y. Developed in cooperation with Behr-Manning Corp., the grinder maintains a thickness tolerance of ±0.0005-inch on the finished stock by using a coated abrasive cover spiral wound on a cast-iron back-up roll. Grinding accuracy depends on the hardness of the material being ground and the amount of stock to be removed.

The coated abrasive cover is secured by a series of clamps that fasten to movable heads on each drum end which exert tension on the cover. Either an oscillating or non-oscillating type of drum can be used on the grinder; the former gives a more uniform finish; while the latter gives longer abrasive

(*Continued on page 423*)



Curtin-Herbert Micro-Grinder

Uniform gage maintained with calender rolls on TIMKEN® bearings

Roll neck wear is eliminated

WITH calender rolls mounted on Timken® tapered roller bearings, the gage of plastic film and rubber sheeting is maintained longer than is possible with sleeve type bearings. Rolls stay in accurate alignment maintaining uniform gage the length and breadth of the sheet.

Since there is no friction between roll neck and bearing, roll neck wear is eliminated. Calenders maintain precision with fewer overhauls. And downtime is minimized since roll necks don't require machining.

The true rolling motion of Timken bearings, plus the smooth surface finish of rollers and races, virtually eliminate friction. Wear within the bearing is negligible, calender roll precision is maintained for longer periods of time.

With Timken bearings, calenders can hold gage to minimum tolerances. Yield is increased — you get more yards per pound. Tapered construction of Timken bearings permits them to take radial and thrust loads in any combination. And due to line contact between rollers and races, Timken bearings have load carrying capacity to spare.

Get the advantages of Timken bearings in your calenders, mills, refiners and mixers. For full information, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

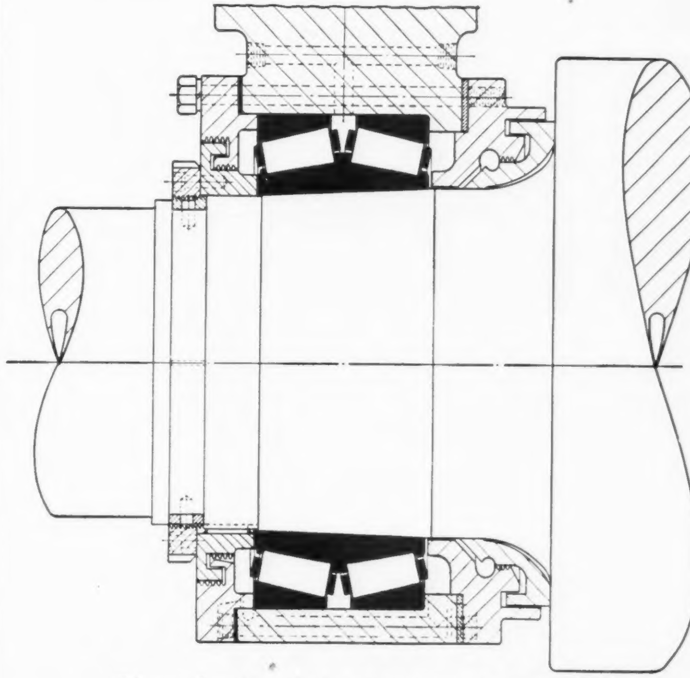


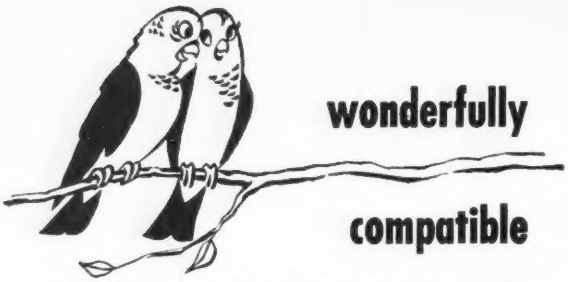
Diagram shows how calender rolls are mounted on Timken bearings to maintain accurate gage of plastic film and rubber sheeting.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL — AND THRUST — LOADS OR ANY COMBINATION



wonderfully compatible

The MEREZ Series (A-B-C-D) of new zinc resinates is so compatible with almost all resins, drying oils and plasticizers that it offers a wide range of formulations and products of interest to rubber compounding formulators. Further, we can tailor-make zinc resinates for specified properties not possessed by any standard products.

- Limed Rosins
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- Tackifiers
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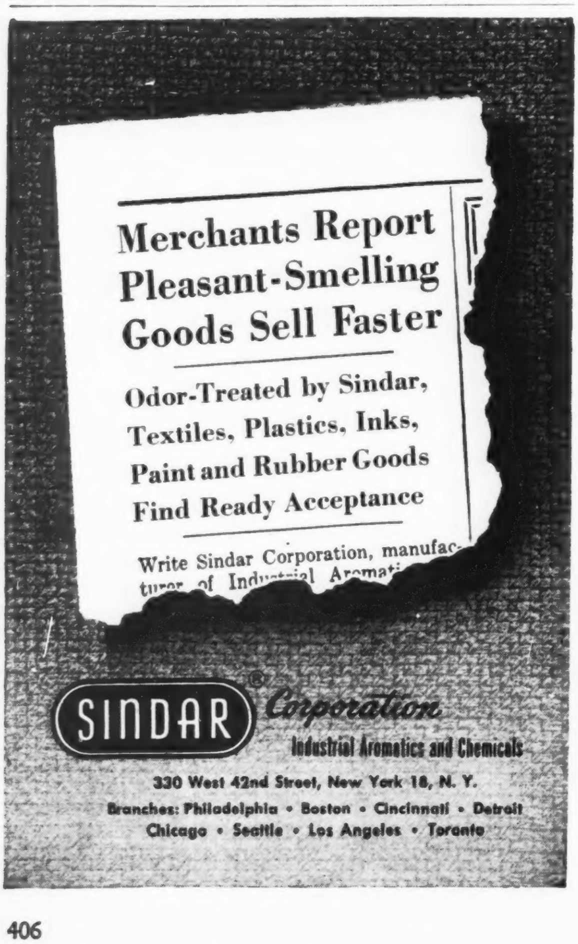


New Materials

New Resin Dispersions

TWO new aqueous resin dispersions, Polyco 426 and 497, have been announced by American Polymer Corp., Peabody, Mass. Polyco 426 is a linear terpolymer resin; while Polyco 497 is a colloidal dispersion of a polyvinyl acetate copolymer resin.

Polyco 426 is a gray, translucent liquid having a total solids content of 38%; pH, 9-10; viscosity at 25° C., 10-20 centipoises; specific gravity, 0.99; and weight, 8.25 pounds per gallon. The resin dispersion deposits soft, tacky films that show excellent adhesion to rayon, nylon, and other synthetic fibers. The addition of Polyco 426 to butadiene-styrene latices and other resin dispersions improves their adhesion to such fibers and glass, it is also claimed. Mixtures with resorcinol-formaldehyde resins can be used to increase greatly the adhesion of synthetic latex films to synthetic fibers, such as in the precoating of yarns before rubberizing. In addition, the permanent tackiness of the resin's films suggests use as a pressure-sensitive adhesive.

Polyco 497 is a translucent liquid having a solids content of 35.0 ± 0.5% and a pH of 6-7. The dispersion deposits films of exceptional clarity and water resistance whose properties approach those of the solvent solutions. Suggested applications include thickening and emulsifying of coatings and sizings; formulation of tack-free adhesives with excellent heat-sealing properties; textile and paper sizing formulations; and floor finishes.

Darex 43G—New Styrene Copolymer

DAREX 43G, a new high styrene coplymer for use especially in soling, floor tile, and wire and cable insulation has been announced by Dewey & Almy Chemical Co., Cambridge 40, Mass. The new polymer is said to provide easier processing, harder stocks, high abrasion resistance, and greater flex life in both low- and high-gravity soling stocks. Another advantage is the greater stability in storage of uncured stocks.

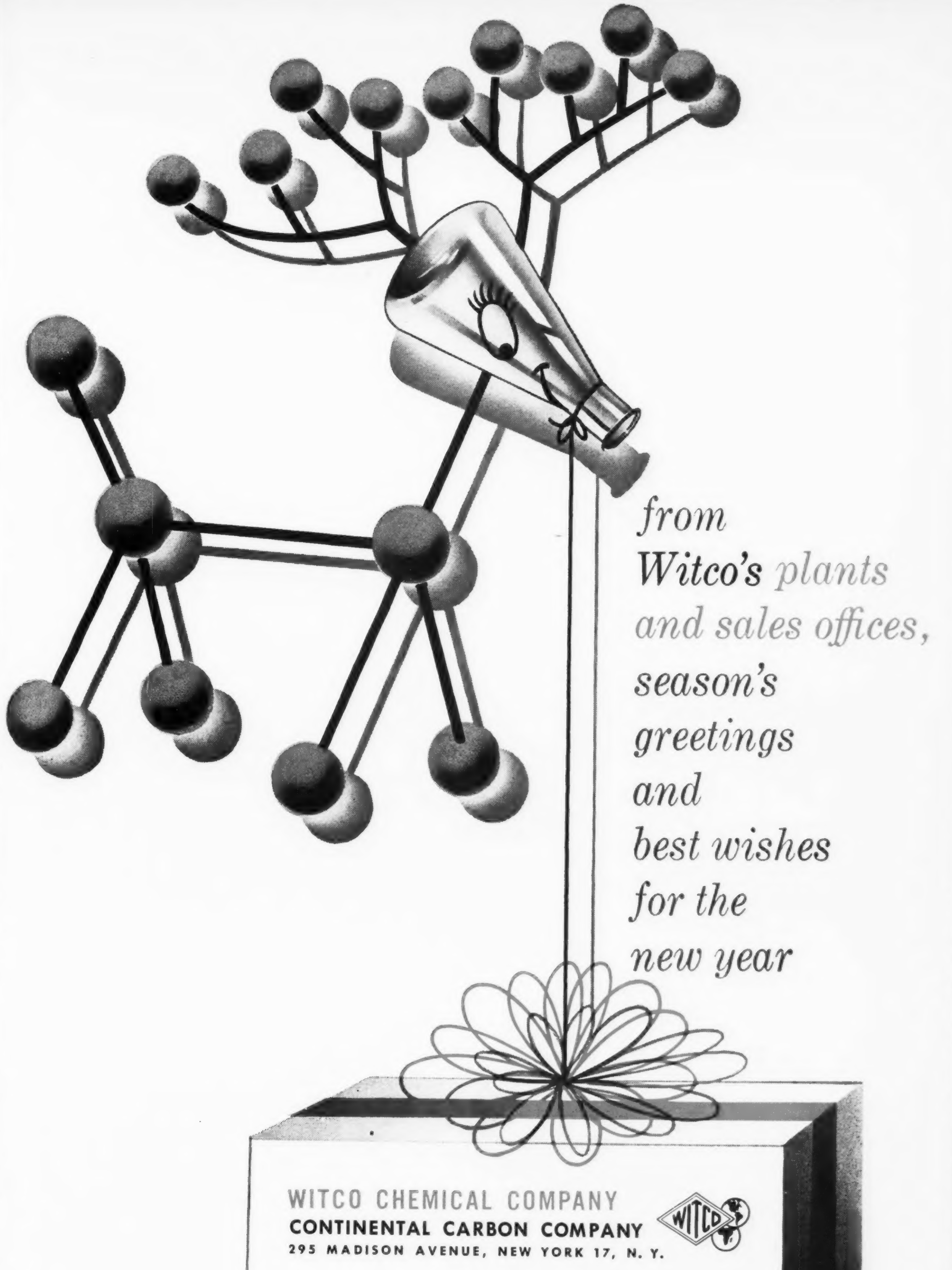
An evaluation of the new polymer in a gum stock formulation in comparison with competitive resins is given in the company's Bulletin C-8. On the basis of the data reported, the advantages of Darex 43G in improving flex life and abrasion resistance are achieved without sacrific of physical properties or processing characteristics of the rubber stock. In addition to uncured storage stability, indications are that mold flow will be superior after storage, thus reducing warm-up and reworking costs and providing flexibility in scheduling compounding equipment.

Octamine—Amine-Type Antioxidant

OCTAMINE, a new amine-type antioxidant, is now available from Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. A reaction product of diphenylamine and diisobutylene, the material is a light-brown, granular, waxy solid having a specific gravity of 0.99, melting range of 75-85° C., and good storage stability. The product is soluble in gasoline, benzol, ethylene dichloride, and acetone, and insoluble in water.

The antioxidant disperses readily in rubber compounds, is non-blooming before and after curing, has a negligible effect on the rate of cure, and provides excellent protection against heat and oxygen, and good protection against flexing fatigue, it is also claimed. Since it is a true secondary amine, Octamine functions equally well in the presence or absence of carbon black. The material develops only very slight discoloration and staining tendencies and is recommended for use in tire carcass, inner tube, foot-wear, heel and sole, proofing, sundries, sponge, automotive rubber, wire insulation, and tiling stocks. For general use 1-2 parts of Octamine per 100 parts of rubber are sufficient in natural rubber, GR-S, neoporene, and nitrile rubbers.

"Heliogen Colors." General Dyestuff Corp., New York, N. Y. 16 pages. The properties and uses of the company's Heliogen colors are described in this brochure. Colors are available in powder, paste, and cake forms for use in rubber, plastics, inks, printing, and all types of coatings.



from Witco's plants and sales offices, season's greetings and best wishes for the new year
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CONTINENTAL CARBON COMPANY
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LONDON AND MANCHESTER, ENGLAND

New Goods

New Goodrich Tire Operates in Sand or Loamy Soil

High Flotation Tire

A NEW off-the-road high flotation tire that provides positive traction in sand or loamy soil has been announced by The B. F. Goodrich Co., Akron, O. Developed in conjunction with the R. G. Le Tourneau Co., Inc., the tire is the 65-inch, 18-ply rating all-nylon wide-base Earth-Mover. Rounded to produce better flotation, the tire operates at relatively low air pressures of 20-25 pounds in sand. The nylon cord body gives improved flexing resistance; while the tapered bead seats prevent slippage on the rim at low pressures. The tire's shallow-type treads do not tend to dig in and become bogged down in sand and loam, and the equipment keeps rolling because of the high flotation.

New Aircraft Tire

A NEW aircraft tire for use in both military and commercial aviation has been announced by The General Tire & Rubber Co., Akron, O. Designated the Aircat, the new low-pressure, extra-wide tire was developed by General under a contract with the Air Force's Wright Air Development Center and is designed to meet the need of a tire with improved flotation. Better flotation enables the tire to maintain mobility in soft terrain without digging in and bogging down the aircraft.

The Aircat measures 36 x 20.00-16 to give a greater area of ground contact. In laboratory tests the new tire withstood more than 500 "stops" on the test wheel, or 2½ times the durability required by Air Force specifications. The Aircat has passed laboratory dynamometer tests at Wright Center and has shown superior flotation qualities during actual landings, take-offs, and taxi tests on all types of terrains, the manufacturer further claims.

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- Triethylene Glycol Dicaprylate—(TG-8)
- Di-iso-octyl Phthalate—(DIOP)
- Di-iso-octyl Adipate—(DIOA)
- Iso-octyl Palmitate—(O-16)

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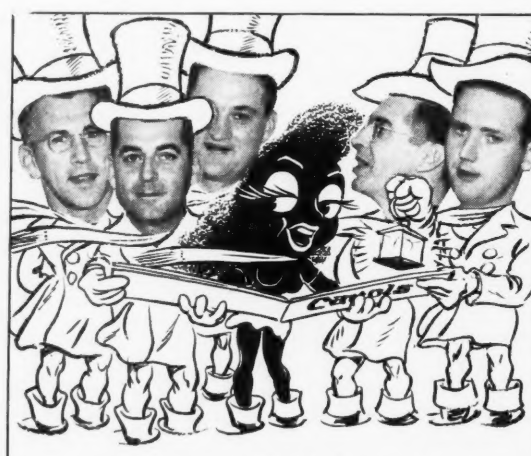

Merry Christmas!

SEE PAGE 296

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A high temperature accelerator for natural rubber, GR-S and GR-A (Nitrile-type rubbers)

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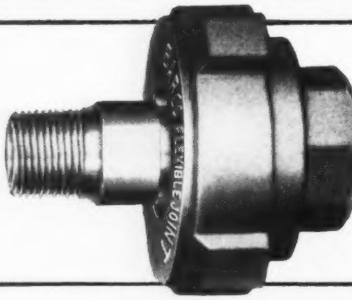

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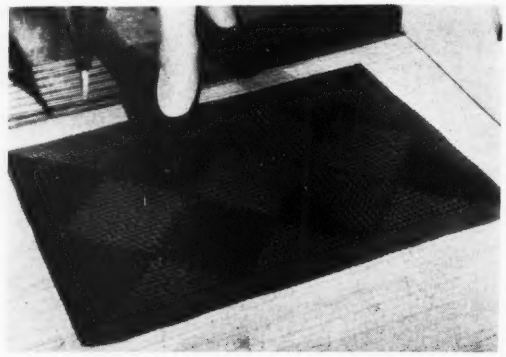
Vinyl Floor Mats

COLORFUL and durable new Vinyloom floor mats to protect and brighten floors in every room of the house are being made by Vinyl Linens, Inc., New York, N. Y. The mats are made of Vinylite plastic sheeting molded with deep, springy carpet textures. In addition to being skid resistant, the mats are easily cleaned and are resistant to water, soaps, detergents, oils, grease, foods, scuffing, tearing, and cracking, it is said. They are also suitable for use as door mats and throw rugs in beach cabanas, bath houses, and boats.



Vinyloom Floor Mat in Rope Pattern

Three-dimensional molding by the Forrest Process reproduces exactly the fine texture of hooked, rope, and braided rug patterns. Choice of 12 decorator colors permits matching the rugs with bath towels, upholstery, walls, linoleum, or other room decorations. Available colors include willow green, taffy blue, cherry, gardenia white, carnation pink, pewter gray, citron yellow, flame red, pebble beige, hunter green, chartreuse, and black. The mats are made in nine patterns and in three sizes, which are as follows: 18 by 25, 24 by 36, and 25 by 41 inches.

Pinwheel Balloons

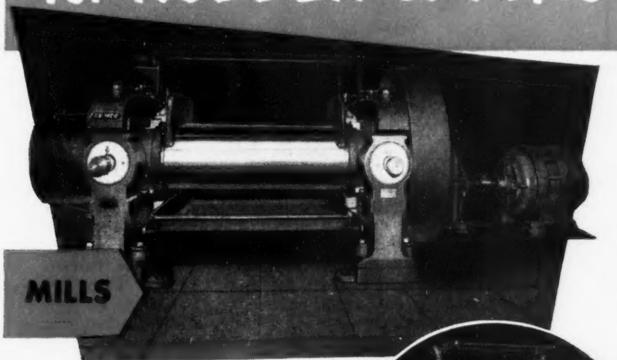
PINWHEEL balloons for use as fun makers and novel party decorations have been developed by Oak Rubber Co., Ravenna, O. When blown up, the balloons assume a circular shape. Upon releasing the inflated balloon, outgoing air imparts

Oak Pinwheel Balloons as Party Decorations

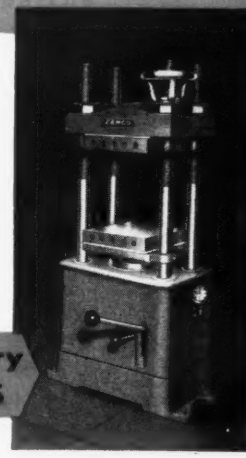
a fast revolving pinwheel action to the balloon. In addition, the balloons can be arranged to form simulated numbers, letters, pretzels, flowers, animals, and other shapes. A cluster effect can be made by twisting each of two infilated balloons at the center and then twisting together the two balloons at their centers.

HEAVY DUTY MACHINERY

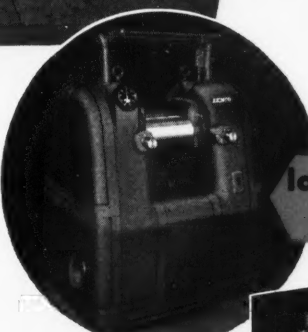
for RUBBER & PLASTICS PROCESSING



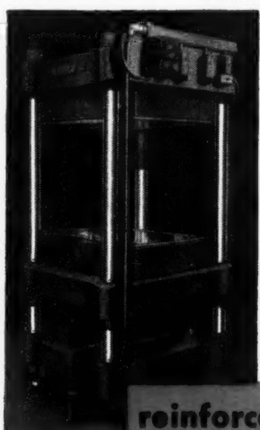
Installations throughout the world attest to the usefulness and productivity of EEMCO Rubber & Plastics Processing Machines. Learn about the speedier production and low upkeep EEMCO offers before you buy. Write for quotations and delivery dates.



Correct design and sturdy dependability are featured in EEMCO Mills. For mixing and compounding all kinds of rubber or plastics, they're furnished in sizes up to 84 inches, in single units or two or more "in line."



The 42 ton laboratory press is entirely self-contained, equipped with 12" x 12" platens. Occupies only 14" x 26" floor space. Adjustable openings. Ideal for laboratory use and small production.



The laboratory mill is self-contained—easy to clean. Rolls which are 6" x 12" are individually cooled or heated. Mills are furnished with constant speed or variable speed drives. For laboratory or small production.

The EEMCO line of hydraulic presses includes presses for compression or transfer molding, laminating and polishing. Manufactured in all sizes they are furnished with or without self-contained pumping units or special features. Consult with EEMCO on all of your rubber and plastics processing machinery needs.

A medium priced line of presses especially designed for reinforced plastics molding is offered in the following standard sizes with a working area of 37" x 55", 47" x 41", 26" x 42", 32" x 36", and 44" x 76". Other sizes made to suit your requirements. With or without pumps and controls this line also offers the molder a complete advisory service in the production of reinforced plastics molded parts or finished products.

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acknowledged superior by all users are important and valuable considerations to the consumer.

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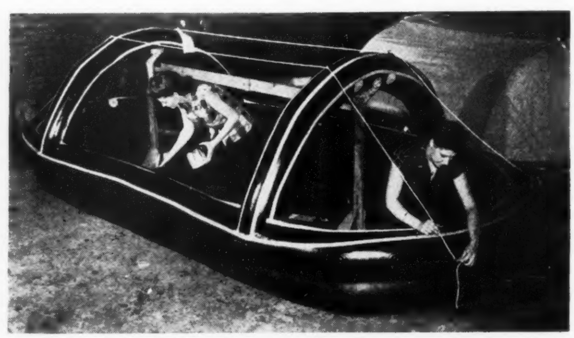
The Country's Leading Makers

Non-Skid Rubbers

SNUG-FIT non-skid shoe rubbers with built-in rubber cleats are being made by Tingley-Reliance Rubber Corp., Rahway, N. J., to provide extra traction on ice, snow, wet golf-course grass, and other uncertain footing. Molded in one piece with no metal cleats to pull out or cause leaks, the rubbers have an average weight per pair of only 14 ounces. They fold compactly and are easily carried in pocket, grip, or golf bag. Since the rubbers are unlined, they are easily washed and dried. The rubbers are made of natural rubber in both brown and black; are availale in both sandal and clog styles; and come in small medium, and large sizes.

Foam Furniture Cushion

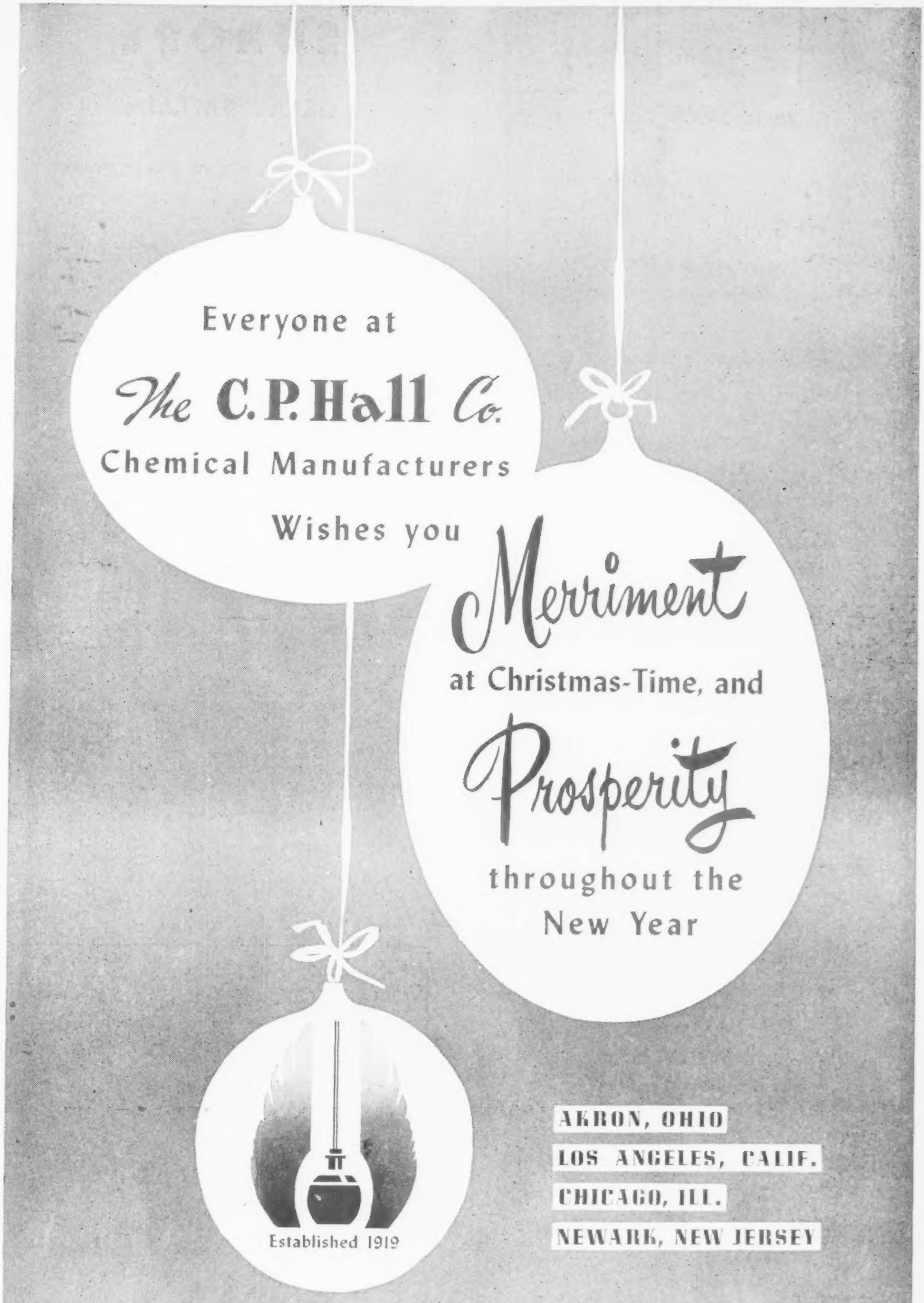
A NEW foam reversible furniture cushion with scientifically designed flare which eliminates buckling of upholstery fabrics at corners is being introduced to furniture manufacturers by Hewitt-Robins, Inc., Buffalo, N. Y. Known as the Restfoam Deluxe, the cushion also has a fine-edge contour that permits smart tailoring, free of wrinkles even when the covers are not cut exactly to pattern, it is further claimed. Made in a thickness of 3½ inches at the box and 5½ inches at the crown, the cushion will be available in various shapes and sizes to fit both modern and period furniture.



Rubber Boat

A 15-PERSON abandon-ship boat is being produced by Goodyear Tire & Rubber Co., Akron, O., for the Navy. The boat is 15⅝ feet long, 7⅓ feet wide, and has a dual wall canopy that offers protection against hot or cold weather. Further insulation is provided by a separate inflatable floor that can be used as a life raft. Made of cotton cloth processed with neoprene, the boat weighs approximately 260 pounds when fully equipped with inflation pump, repair kit, four paddles, floatable knife, and heaving line.

The deflated boat is held in a carrying case which has accessory containers for storing survival equipment. The boat is capable of being inflated within 30 seconds by compressed carbon dioxide and can withstand a drop of 35 feet into the water without damage, it is claimed. Nylon boarding ladders with rubber covered cross-pieces are conveniently located at each end of the boat.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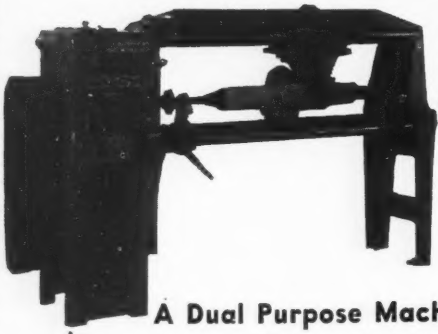

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EUROPE

GREAT BRITAIN

Rubber Research and Development

In 1948 a memorandum outlining a five-year plan and entitled "Natural Rubber: Research and Development," was presented to the Government of the Federation of Malaya on behalf of the British Rubber Producers' Research Association, the British Rubber Development Board, and the Rubber Research Institute of Malaya. The general objective of the plan was research and development work to increase the range and the quality of articles made largely or partly from natural rubber. The progress made during 1951, the third year of the plan, is reviewed by the director of research in the BRPRA's fourteenth annual report.

From the outset one of the aims of this organization has been to increase the understanding of the physical properties of rubber, and one of the results of efforts in this direction has been that both natural and synthetic rubber are increasingly being considered by technologists as scientifically defined materials. Consequently it is believed that in the future engineers will be able to design articles in rubber with the same confidence as they now have in designing with metals—that is, the properties of the final article will be more accurately predictable from the drawing board. To encourage engineers to consider rubber seriously, BRPRA has appointed an engineer, working in close touch with physics and technology groups, to contact engineers wishing to employ rubber and with them to explore the possibility of solving their problems by its use.

Among the advances made in the year under review is mentioned a new understanding of heat build-up made possible by theoretical studies of the elastic properties of rubber which are made in terms of a stored energy function. The stored energy function, which describes mathematically the work needed to produce a given deformation in a piece of rubber, is made up of two parts, one of which is related to the state of cure, and the second to the hysteresis of rubber. The second part represents the essential difference between the physical properties of natural and synthetic rubber, and when it is large—as it is in most synthetic rubbers—the rubber is less resilient and shows greater heat build-up under dynamic strain.

BRPRA and Rubber Technical Developments have collaborated in working out a process for producing cyclized rubber based on the Dutch discovery that cyclized rubber can be made from natural rubber latex by reaction with sulfuric acid, and a pilot plant has been set up. Soling material, made of equal parts of natural rubber and cyclized rubber, has been tested and favorably reported on by the British Boot, Shoe & Allied Trades Research Association and also by some British manufacturers. The process for cyclized rubber production is considered suit-

Merry Christmas!

SEE PAGE 296

SANTOFLEX means EXTRA FLEX

Hard-working rubber products that flex and flex and flex serve longer without cracking when you add Monsanto Santoflex B, Santoflex BX or Santoflex 35 to your formulations. In addition, these antioxidants impart weather and ozone resistance to both GR-S and natural rubber.

In natural rubber—Unprotected Compound A started to crack in 5 hours. Compound B, containing 1½ parts of Santoflex B on 100 parts of rubber hydrocarbon, ran 23 hours before cracking. Test continued for 214 hours.

In GR-S (LTP)—Compound A, unprotected, started cracking in 16 hours. Compound B, containing 1½ parts of Santoflex B on 100 parts of GR-S, did not crack until 43 hours. Test was run a total of 140 hours.

Samples were flexed in an ozonized chamber using the standard test atmosphere of 25 parts ozone per 10^8 parts air.

Specifications

	Appearance	Ash	Insolubles (benzene)	Specific Gravity
SANTOFLEX B 1,2-dihydro-2,2,4-trimethyl-6-phenylquinoline	Dark, waxy lumps	0.1% max.	Trace max.	1.11 @ 25° C.
SANTOFLEX BX Blend of 85 parts Santoflex B and 15 parts N,N'-diphenyl-p-phenylenediamine	Dark, waxy lumps	0.3% max.	1% max.	1.12 @ 25° C.
SANTOFLEX 35 Blend of 65 parts Santoflex B and 35 parts N,N'-diphenyl-p-phenylenediamine	Dark, waxy lumps	0.5% max.	1.5% max.	1.14 @ 25° C.

MONSANTO CHEMICALS FOR THE RUBBER INDUSTRY

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Santoflex* B
Santoflex BX
Santoflex 35
Santoflex AW
Santowhite* Crystals
Santowhite MK
Santowhite L

ALDEHYDE AMINE ACCELERATORS
A-32
A-77*
A-100

MERCAPTO ACCELERATORS
Santocure*
El-Sixty*
Ureka* Base
Mertax (Purified Thiotax)
Thiotax (2-Mercapto benzothiazole)
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GUANIDINE ACCELERATORS
Diphenylguanidine (D. P. G.)
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Ethyl Thiurad (Tetraethylthiuram disulfide)
Mono Thiurad (Tetramethylthiuram monosulfide)
Methasan* (Zinc salt of dimethyl dithiocarbamic acid)
Ethasan* (Zinc salt of diethyl dithiocarbamic acid)
Butasan* (Zinc salt of dibutyl dithiocarbamic acid)

WETTING AGENTS AND DETERGENTS
Areskap* 50
Aresklene* 375
Santomerse* S
Santomerse D

SPECIAL MATERIALS
Thiocarbanilide ("A-1")
Santovar*-A
Santovar-O
Sulfasan* R
Insoluble Sulfur "60"
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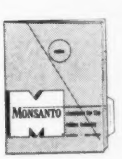
For information on these and some two score other Monsanto Chemicals for rubber, write for the 46-page, file-size booklet, "*Monsanto Chemicals for the Rubber Industry,*" or contact MONSANTO CHEMICAL COMPANY, Rubber Chemicals Sales, 920 Brown Street, Akron 11, Ohio.



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able for conditions in the Far East, and it is intended to set up a pilot plant there to enable rubber growers to decide on the feasibility of undertaking manufacture on the scale needed to satisfy the market.

Mixtures of rubber and other plastics are also being investigated. An alternative method of incorporating the polymers is being tested which involves the production of the polymer in the presence of the rubber. Catalyst systems have been worked out by which methyl methacrylate or styrene can polymerize in ammoniated latex, and it is expected that the resultant products will differ significantly from products obtained by simply mixing the polymer with rubber. Pilot-plant work is to be started by RTD.

Substantial progress in the commercial production of Technically Classified Rubber during the year is recorded. In Malaya rate of output reached about 1,250 tons a month at the end of the year.

Laboratory investigations of the incorporation of rubber in bitumen, started by BRPRA, are to be extended in collaboration with various interested research organizations. Modification of the rubber, and the combination of rubber and tar are also being studied; a trial road section is being laid with a rubber-tar mixture.

Work has been continued on the use of peroxide vulcanizing agents; various types of compounds could be made, and vulcanizates of exceptional transparency could be prepared. For black compounds, the choice of carbon blacks is limited since most types decompose peroxides. Chemical studies of sulfur vulcanization indicate the possibility of producing a sulfide cross-link and at the same time saturating the double bonds at the point of attachment of the sulfur by using a vulcanizing agent based on sulfur and an amine. It is believed that such structures will aid resistance to aging.

Polyglycol heat-sensitizing agents for latex have been investigated, and one compound has been selected for general use and is being evaluated by RTD. Polyglycol compounds may also prove useful in the production of latex foam rubber.

New work on control of plasticization and aging has established that the actual process of breakdown of rubber on a cold mill occurs by a mechanical breakage of the long rubber molecules into shorter fragments. In nitrogen the fragments recombine, and the rubber remains hard; in air, the fragments oxidize, and they have much less tendency to recombine. Besides oxygen a whole range of substances has been found to operate along these lines.

New machines have been designed to study the properties of rubber in vibration and to study cut-growth.

A note in the report by the BRPRA board reveals that exploratory work on the use of radio-active isotopes in the analysis of molecular structure is to be conducted in new extensions to the laboratories at Welwyn Garden City.

IRI Foundation Lecture

The Seventh Foundation Lecture of the Institution of the Rubber Industry, 1952, was delivered at a highly successful gathering at Wolverhampton on May 23 by R. P. Dinsmore, vice president of the Goodyear Tire & Rubber Co., who chose for his topic "Economic and Physical Aspects of GR-S Modifications."

In an editorial note *India Rubber Journal*[1] said of the lecture: "Dr. R. P. Dinsmore's paper was packed with information, and it was obvious that he had been extremely painstaking in the preparation of it, but we doubt very much whether keen students of his subject among the audience would claim that they found the paper very revealing. And who could blame Dr. Dinsmore for that?"

After the dinner following the lecture, Sir Clive Baillieu, president of IRI and chairman of the Dunlop Rubber Co., Ltd., acting on behalf of members of the IRI, presented a diamond ring and matching earrings to Miss C. Carden, former secretary of the Institution, as a token of appreciation of her long and faithful service. Miss Carden, who joined the organization in 1922 and became its secretary in 1940, retired in 1951. At present she is editor of the London *Rubber Age and Synthetics*.

[1] May 31, 1952, p. 1.

British Trade Notes

A survey conducted by the Federation of British Industries for 1950-51 indicates that total expenditures for research and development in British industry have increased at least 50% since the last survey made in 1945-46.

Midland Silicones, Ltd., London, which has been handling the Dow Corning product Silastic, is now also manufacturing silicone rubbers. Both the imported material and that made in the United Kingdom are to be marketed under the name, Silastomer.

Styrene Co-Polymers, owned jointly by Lewis Berger, Petro-Chemicals, and Pinchin Johnson, will increase its capital from £250,000 to £350,000 by the issue of 37,500 6% cumulative convertible preference £1 shares and 62,500 £1 ordinary shares.

A new British Export Trade Research Organization (1952) has been formed to take the place of the former BETRO, now in liquidation. The 1952 organization will not be a trading body.

Among the names on the Queen's Birthday Honors List was that of T. J. Drakeley, principal of Northern Polytechnic and director of the new National College of Rubber Technology, London, who was awarded the C.B.E. (Commander of the Order of the British Empire). Dr. Drakeley was born at Barwell, Leicester, in 1890, and for more than 30 years has been continuously active on behalf of the rubber industry. He started a course in rubber technology for adults at the Polytechnic in 1920 and inaugurated the first complete rubber trade school course in September, 1923. Later he became principal of Northern Polytechnic, and, when the National College of Rubber Technology was founded not long ago, he was made its director. Dr. Drakeley edited the *Transactions of Institution of the Rubber Industry* from 1925 to 1950.

The construction of the buildings of the National College of Rubber Technology is nearing completion. The three-year full-time course commenced in September.

The College is expected to accommodate up to 200 students, including parttime ones. It is believed to be larger and better equipped than any American college devoted to teaching rubber technology, and better equipped than any other institute exclusively designed for teaching rubber technology and rubber research.

NETHERLANDS

Papers on Industrial Rubber Research

At the three-day conference on the Progress in Industrial Rubber Research organized by Rubber Stichting and held at Delft, July 1-3, members of the staff of Stichting and of the Technical University of Delft presented several papers, of which brief summaries follow:

"Composition and Reactions of Latex," by G. M. Kraay, discussed the changes in the adsorption layer of the rubber particles during storage of latex and how these changes influence mechanical stability and sensitivity to cations (zinc ions).

"Degree of Dispersion of Rubber in Latex" by M. van den Temple, made use of the electron microscope, since the majority of the particles in latex are to small to be observed under the usual light microscope. These tiny particles account for only a very small part of the total rubber present in latex, but since their number and their size determine the specific surface area and colloid chemical properties of latex, they largely influence stability.

"Ebonite from Latex," by A. J. de Vries, reviewed methods of applying latex ebonite—casting heat-sensitized latex mixes in metal molds; cold-casting in water-absorbent plaster molds; impregnating fabrics for use as laminated materials; lining and covering metal objects with hard rubber by dipping, extrusion, or spreading methods. The mechanical properties were compared with those of bakelite and of ebonite from dry rubber. Vulcanization under light pressure improved properties considerably, but impact bending strength remained below that of ordinary ebonite; water absorption, it was suggested, was probably responsible for the poorer electrical properties.

"Behavior of Rubber at Low Temperatures," by A. van Rossem, dealt with the physical changes occurring at reduced temperatures, crystallization and "freezing" of the elastomer chains, and the differences in behavior of natural and some synthetic rubbers were compared. The various methods available for examining elastomers at low temperatures and results obtained were discussed.

"Cromatography," by G. Salomon, demonstrated the possibilities of this method of analysis, combined with other methods, for the investigation of complex mixtures of organic substances. It was stressed that the distribution method was due to displace the adsorption method as the former gives more readily reproducible results.

"Rubber in the Building Industry," and "Recent Developments

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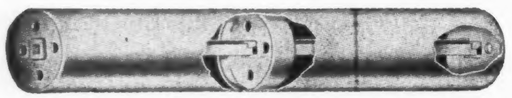

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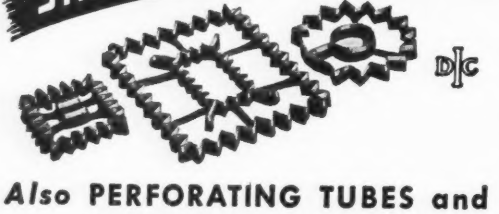

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in Rubber Testing" were both by P. Braber. In his first lecture Dr. Braber treated of new applications of rubber in the building industry, some of which have been developed at the Stichting. In the second paper he reviewed new testing methods which aimed at better correlation between results of laboratory tests and behavior under actual conditions of use.

"Reinforcing Fillers," by R. Houwink, showed that reinforcement of rubber depends on reciprocal action between polymer and reinforcing agent. The strength of the resulting bonds depends mainly on Van der Waals forces; chemical forces are considered less important; spatial relationships of the filler surface also play a part, especially where carbon black is concerned. Prospects for further improvement of mechanical properties by reinforement were also dealt with.

"Rubber-Resin Compounds," by H. C. J. de Decker, covered theoretical and practical possibilities of mixtures of rubber and resins.

"Abrasion of Rubber," by H. C. J. de Decker, summarized results of the International Symposium on Abrasion and Wear (Delft, 1951); pointed out the present limits of abrasion science; and outlined a program of systematic research to improve abrasion resistance of tires.

"New Compounding Ingredients," by W. J. K. Schonlau, reviewed new fillers and chemicals developed for the rubbber industry in the last ten years.

"Permeability of Rubber to Gas," G. J. van Amerongen, compared the permeability of natural rubber with that of Perbunan, "Thiokol," and butyl and discussed methods to improve permeability of the former, including the addition of polymers like "Thiokol" or Vistanex to natural rubber; also the possibilities of lamellar fillers as aluminum or mica powder.

"Vulcanization," by J. van Alphen, covered theories and various experiments on vulcanization of natural rubber. It was shown that the degree of vulcanization of latex films is best determined by swelling measurements and the T-50 test. The effect of oxygen on the SH bridges formed during vulcanization was demonstrated. It was concluded on the basis of results of experiments that Barton's theory, as a partial explanation of the vulcanization reaction, has gained much in probability.

"Vibration Damping," by C. W. Kosten, stated soft rubber usually gives the best results; however, only vibrations whose frequency exceed twice the resonance frequency can be isolated, so that satisfactory vibration damping of machines running at 500 r.p.m. is very difficult. While rubber spring elements are more effective than steel elements, use of the former involves more complex calculations. Up to now general rules and formulae are available only for shear and compression loads of cylinders and other simple geometrical shapes.

New Plastics Organization

Plastics manufacturers in Holland, many of whom are too small and financially too weak to exploit properly possible markets for their products abroad, have formed an export combine, "Exoplastics." This organization, which includes only members of the Netherlands Association of Plastics Manufacturers, will have agents all over the world.

A large new factory for plastics for the lacquer and adhesive industries is being constructed for the recently established N. V. Synthese, The Hague. The company will operate under licenses from Reichhold Chemicals Inc., Detroit, Mich., U.S.A.

GERMANY

Deutsche Dunlop Gummi, Hanau, Dunlop's German subsidiary, is to receive regular bulk shipments of latex from Dunlop plantations in Malaya. The latex will be shipped to Rotterdam, Netherlands, where it will be transferred to storage tanks, from which it will be sent in bulk rail tank cars to Hanau. The first shipment of 60,000 gallons was recently delivered.

The Rheinland Section of the Deutsche Kautschuk Gesellschaft met September 26, in Leverkusen when short papers were read on the present status of neoprene processing, in addition to a longer one on silicic acid and silicates as white reinforcing fillers for rubber.

On September 29, E. J. Buckler, of Polymer Corp., Ltd., Sarnia, Ont., Canada, who has been traveling in Europe, was scheduled to speak on "Properties and Processability of Butyl Rubber, and Fields of Application of Butyl Rubber," before a meeting of the D.K.G. in Bad Konigstein, Taunus.

Editor's Book Table

BOOK REVIEWS

"Soluble Silicates, Their Properties and Uses. Volume I: Chemistry." James G. Vail, assisted by John H. Wills. American Chemical Society Monograph No. 116. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. Cloth, 6 by 9 inches, 369 pages. Price, $9.

Written to replace the out-of-print "Soluble Silicates in Industry," A.C.S. Monograph No. 46, this comprehensive two-volume monograph will provide a complete review of the properties and applications of soluble silicates. Volume I, devoted to the theoretical aspects of the subject, covers past and present manufacturing processes; properties of homogeneous and heterogeneous systems; the formation of metallic silicates; and other fundamental material. Volume II, to be published shortly, will treat of the applications of soluble silicates to industry.

While dealing essentially with fundamental information, Volume I does contain some mention of applications. For example, there are concise discussions of the use of silicates in rubber, latex, and plastics. Throughout the book the emphasis is on clear, simple language, with a minimum of mathematics and highly specialized material, and selected literature and patent references are given to permit the reader to obtain further detailed information. The subject matter is divided into five chapters, covering history, present practices, homogeneous systems, heterogeneous systems, and complex systems. Both author and subject indices are appended.

"American Handbook of Synthetic Textiles." Herbert R. Mauersberger. Textile Book Publishers, Inc., 303 Fifth Avenue, New York 16, N. Y. Cloth, 5 by 7½ inches, 1,231 pages. Price, $10.80.

This handbook is a practical reference text on the commercial synthetic fibers, their properties and textile processing methods. Written in conjunction with 20 collaborators, the book provides a comprehensive, up-to-date discussion of synthetic textiles in relatively simple, non-technical language. More than 430 tables, charts, flow sheets, and illustrations are included to simplify the highly technical phases to such an extent that even a layman can understand them. In compiling into one work material hitherto available only from widely scattered sources, the book will be of value to everyone in the textile and related industries.

The text is composed of 20 chapters which cover historical background; economics and statistics background; preparation of cellulose; cellulosic fiber, yarn, and tow processes; manufacture of nylon yarns and staple; manufacture of synthetic fibers, filaments, and yarns other than nylon; processing of synthetic staple; winding, coning, and filling preparation; warping and warp sizing; throwing and twisting; weaving of synthetic fabrics; synthetic gray goods constructions; manufacture of knit goods; dyeing of synthetic; dye nomenclature; synthetic piece goods printing; finishing of synthetic fabrics; performance standards for rayon fabrics; identification of synthetics fibers by X-ray diffraction; and books, bibliographies, and literature references. An appendix giving trade practice rules and domestic tariff rates is included, and there is a detailed subject index.

NEW PUBLICATIONS

"Foxboro Temperature Recorders." Bulletin 447. Foxboro Co., Foxboro, Mass. 20 pages. Aimed to aid in the selection of correct temperature measurement systems in industrial applications, this illustrated bulletin discusses the design and operating feature of the company's temperature recorders, shows typical installations, and presents applicable engineering data.

"Paracril Nitrile Rubbers: Compounding and Processing Plasticizers." Technical Bulletin No. 4. Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. 24 pages. Extensive test data are given on the effects of 29 commercial plasticizers on Paracril B vulcanizate properties. Comparative data appear also for different accelerator systems, and separate sections discuss test methods and procedure for determining Mooney viscosity, scorch, and cure times.

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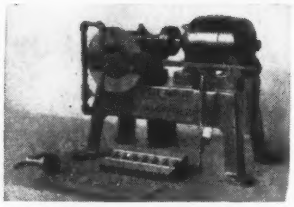

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"Apparatus for the Measurement of the Dynamic Shear Modulus and Hysteresis of Rubber at Low Frequencies." W. P. Fletcher and A. N. Gent. British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts., England. Publication No. 163. 4 pages. An apparatus is described which subjects a rubber specimen to a force in simple shear adjustable frequency. The measurements allow calculation of the dynamic shear modulus and hysteresis.

"Custom Extrusions in Thermoplastics." Anchor Plastics Co., New York, N. Y. 4 pages. This illustrated folder gives information on the company's facilities and services in the design and manufacture of extrusions, as well as general descriptions of the various thermoplastics and their properties, and the forms and shapes of extruded plastics.

"The Story of Safety." E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 28 pages. This bulletin describes and illustrates the various phases of du Pont's comprehensive safety program which is said to make its employes four times safer at work, even when handling high explosives or volatile chemicals, than they are in their own homes or elsewhere.

"More Dependable, Economical, Flexible Central Hydraulic Systems for the Rubber and Plastics Industries." Bulletin 900. Greer Hydraulics, Inc., Brooklyn, N. Y. 8 pages. Hydraulic systems for compression molding presses are illustrated and described. Weight-loaded and hydro-pneumatic accumulator systems are compared, and schematic diagrams show hook-ups for different conditions. Information is also offered on the calculation of required accumulator capacity for a typical press plant.

"Flexible's Line of Tubing." Catalog C2-3. Flexible Tubing Corp., Guilford, Conn. 4 pages. This illustrated bulletin describes the firm's complete line of flexible tubing made of fabric reinforced rubber or plastic wound on helical wire coils. Properties and applications of the tubing are covered.

"1953 Condensed Reference File of Bakelite and Vinylite Plastics and Resins." Bakelite Co., Division of Union Carbide & Carbon Corp., New York, N. Y. 16 pages. This current edition of the "Reference File" briefly describes the properties of more than 50 plastics and resins made by the company and contains 110 photographs showing typical applications and finished products.

"Bakelite Polyester Resins for Reinforced Plastics." 27 pages. Besides complete information on the compositions and properties of the Bakelite polyester resins, this bulletin gives information on processing, bench life, compounding, casting, applications, and related data.

"Calcene NC." Pigment Data Bulletin No. 52-4. Columbia-Southern Chemical Corp., Fifth Ave. at Bellefield, Pittsburgh 13, Pa. 4 pages. In addition to the properties of Calcene NC, a fine-particle precipitated calcium carbonate, this bulletin gives laboratory test data comparing the product with Calcene TM and three other ultra-fine calcium carbonates in a typical drug sundries compound. Data cover compounds made by both direct mixing and by pigment masterbatching.

"PK Dry Blending Equipment, Processing Equipment, Heat Exchangers." Catalog No. 12. Patterson-Kelley Co., Inc., East Stroudsburg, Pa. 12 pages. This catalog gives design data, capacities, applications, and specifications for the firm's twin-shell, double-cone, and ribbon blenders; kettles, evaporators, stills, agitators, autoclaves, and pilot-plant equipment; and heat exchangers.

"Zinc Oxide as an Activator with Reclaimed Rubber." Report No. 18. Midwest Rubber Reclaiming Co., East St. Louis, Ill. 4 pages. Data show the effect of adding increasing proportions of zinc oxide to Midco-B, a first-line whole tire reclaim, and to mixtures of the reclaim with natural rubber and GR-S. Recommended quantities of zinc oxide are derived on the basis of test data presented.

"Octamine, Solid Amine-Type Antioxidant." Compounding Research Report No. 20. Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn. 10 pages. This report gives information on the properties, compounding, and recommended uses for a new antioxidant that is said to provide maximum protection with minimum staining. Data are offered on its use in various types of natural and synthetic rubber stocks.

"The Goodyear Story." Goodyear Tire & Rubber Co., Akron, O. 24 pages. This new edition of the firm's general booklet gives a brief history of its growth and covers the scope of its varied activities. Included are descriptions and illustrations of plants here and abroad, and a review of technical achievements in materials and processing.

"Stillman Rubber Co." Stillman Rubber Co., 5811 Marilyn Ave., Culver City, Calif. 8 pages. The facilities and products of this company are described and illustrated in this brochure. The firm specializes in rubber-to-metal bonding and is a custom molder of precision rubber products.

"Magic-Vulc Products." Magic Chemical Co., Brockton, Mass. 22 pages. This catalog describes the types and applications of the company's Magic-Vulc products, including rubber base coatings, adhesives, and sealing compounds. Of interest is the section on Magic-Vulc Plastic Rubber describing its use for the coating and repair of worn conveyor belts.

"Richardson Automatic Gravity Operated Liquid Scale." Bulletin No. 5204. Richardson Scale Co., Clifton, N. J. 2 pages. This data sheet gives photographs and engineering drawings of the liquid scale, together with information on operation, capacity, rate of discharge, and special features.

"It's Your Society." Bulletin 1, Sixth Edition, 1952. American Chemical Society, 1155 Sixteenth St., N. W., Washington 6, D. C. 80 pages. This comprehensive illustrated booklet describes the organization and activities of the A. C. S., including sections and divisions, meeting, publications, employment aids awards, etc.

"Piccopale." Pennsylvania Industrial Chemical Corp., Clairton, Pa. 12 pages. This brochure gives the properties, grades, and applications of Piccopale, a new hard hydrocarbon raw material. Industrial uses include rubbers, plastics, adhesives, floor coverings, dressings and finishes, textiles, and others.

"You and US." United States Rubber Co., New York 20, N. Y. 26 pages. This illustrated booklet is designed to acquaint the reader with U. S. Rubber. Topics covered include the company's history, products, plants and branches, stockholders, management, personnel, sales and purchasing methods, and policies.

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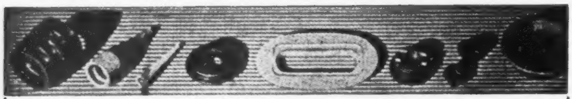

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Stress Relaxation

(*Continued from page* 362)

increase and volume swell (shown in Figure 14) is that the former may be predicted from the data of the latter more easily performed test.

Conclusions

The practical implications of this study are that rubber compounds which swell in the presence of oil have a property which may be utilized in some applications where it may serve a useful purpose. Examples are: O-ring seals and other types of gaskets where the rubber is used in compression. In these cases the stress decays more slowly with time, and in some cases the force would increase, and the tendency to leakage would be minimized. In these experiments the sample was relatively unconfined except for the direction of loading with only low frictional forces which tended to prevent increase in volume. It was noted (Figures 4 and 6) that with natural rubber and GR-S at 70° C. the stress reached a maximum between 1,000 and 10,000 hours which is a result of the sample reaching equilibrium with respect to swelling by the oil, and the stress then decreases, depending on the oxidative scission of bonds in the same manner as found for tests conducted in air. However, according to Scott,[4] the attack of swelling agents accelerates oxidation; so it is possible that this oxidative scission might be in addition to that normally measured in air.[8]

[8] A. V. Tobolsky, I. B. Prettyman, J. H. Dillon, *J. Applied Phys.*, 15, 380 (1944).

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(*Continued from page* 404)

life. The grinding drum is completely enclosed, and an exhaust duct is built into the hood.

The web stock is fed into the grinding area by a series of rubber covered pinch rolls and is supported during grinding by an adjustable steel billy roll mounted directly under the grinding roll. A dial indicator on the fee table provides a visual means of adjusting the cut. The grinders are made in standard widths of 40-52 inches, but can also be furnished in widths ranging from 12-80 inches. A special version of the grinder is also available for sueding continuous webs of textiles.

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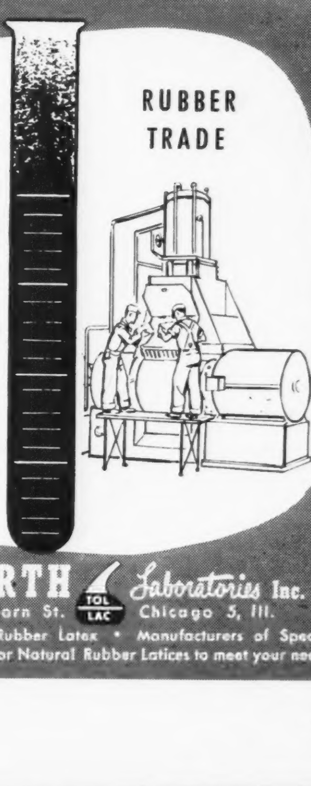

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MARKET REVIEWS

RUBBER

RENEWED activity and rising prices featured both the spot and the futures rubber markets during the period from October 16 to November 15. On the physical market, keen factory buying interest was noted, with emphasis on the lower grades which scored relatively larger price advances to narrow the gap between the high and the low grades. Of interest, however, was the fact that for the first time in several months prices for the top grades followed along with the lower grades to mark up advances. The major factors behind the spot market rises were: (1) factory buying to cover requirements well into the first quarter of 1953; (2) attempts to certify physical rubber against the large December open interest; and (3) the firm, rising trend in foreign markets which reported considerable factory buying interest in the Far East.

New York Spot Market
Week-End Closing Prices

	Sept. 27	Oct. 18	Oct. 25	Nov. 1	Nov. 8	Nov. 15
R.S.S.: #1	28.50	27.50	27.75	27.75	28.25	29.75
2......	27.75	26.00	26.00	26.00	27.00	28.25
3......	27.00	25.00	25.00	25.00	25.75	26.75
Latex Crepe:						
#1 Thick	38.50	37.00	36.50	36.50	37.00	37.50
Thin	38.50	37.00	36.50	36.50	37.00	37.50
#3 Amber Blankest:	24.50	24.00	24.25	24.50	25.25	26.00
Thin Brown Crepe	23.00	23.00	23.00	23.25	24.00	25.00
Flat Bark	19.75	21.00	22.00	22.25	23.00	24.50

The spot price for #1 Ribbed Smoked Sheets started the period at a low of 27.50¢ and closed at a high of 29.75¢. Other spot grades showed the same movement over the period: #2 R.S.S. went from 26.00 to 28.25¢; #3 R.S.S., from 25.00 to 26.75¢; Latex Crepe, from 37.00 to 37.50¢, after dropping to a low of 36.00 on October 22; #3 Amber, from 24.00 to 26.00¢; #3 Thin Brown Crepe, from 23.00 to 25.00¢; and Flat Bark, from 21.00 to 24.50¢.

Commodity Exchange
Week-End Closing Prices

Futures	Sept. 27	Oct. 18	Oct. 25	Nov. 1	Nov. 8	Nov. 15
Mar...	25.15	25.55	26.65	26.75	26.80	27.85
May...	24.85	25.25	26.20	26.00	26.15	27.15
July.....	24.60	24.85	25.80	25.50	25.65	26.75
Sept.....	24.60	24.60	25.50	25.15	25.30	26.10
Dec.....	...	...	...	25.15	25.30	26.10
Total weekly sales, tons	1,460	1,000	2,310	2,860	1,160	4,850

Rising prices on the rubber futures market in the Commodity Exchange followed the trend of the spot market. Short covering dominated the action in nearby December futures: liquidation played the major role in March futures; May futures showed a greater proportion of covering; July futures showed equal measures of liquidation and covering; and new buying emerged in the distant September and December futures. By the end of the period the open position was down to reasonable levels, and market observers believed that further bullish factors from outside the market would be needed if the upward trend were to continue.

As with the physical market prices, futures prices went from lows at the start of the period to highs at the close, as follows: December, 26.95 to 29.80¢; March, 25.60 to 27.85¢; May, 25.05 to 27.15¢; July, 24.75 to 26.75¢; September, 24.50 to 26.10¢; and December, 24.70¢ (at opening call on October 29) to 26.10¢. During the second half of October, 6,010 tons were sold on the Exchange, making the total for the month 8,250 tons. The sales volume for the first half of November amounted to 6,010 tons.

Latex

OWING to the fact that demand for both *Hevea* and GR-S latices appears to be increasing at an unexpected rate, a further tightening of supplies of *Hevea* latex took place during the period from October 16 to November 15. It had previously been hoped that added supplies and an expected slight diminishing of demand might relieve the situation in January, but market observers now believe that the tight-supply condition will prevail well into the first quarter of 1953. No reduction in domestic demand is forecast during the first quarter, and the effects of wintering are expected to reduce latex arrivals in this country. By the end of the market period, prices for January deliveries had risen from 34¢ to about 36.5-37¢ a pound, dry solids.

It was reported that the London latex market had liquidated its stock position, and that *Hevea* latex is tight both in the United Kingdom and on the Continent. Despite prospects of continuing high demand, latex producers are understandably reluctant to increase their output in view of the past history of alternating periods of glut and shortage in supplies. Further complicating the production picture is the civil unrest in both Malaya and Sumatra and the apparently deteriorating Indonesian situation.

Final August and preliminary September domestic statistics on *Hevea* and synthetic rubber latices are given in the following table:

(All Figures in Long Tons, Dry Weight)

	Production	Imports	Consumption	Stocks
Natural latex:				
Aug.........	0	4,684	4,352	9,108
Sept.*.......	0	3,716	5,170	7,845
Oct.*.........	0	4,500	5,400	7,000
GR-S latices:				
Aug.........	3,129	302	3,097	4,349
Sept.*	3,155	242	3,736	4,049
Neoprene Latex:				
Aug.........	643	0	651	1,006
Sept.*	843	0	670	1,091
Nitrile latices:				
Aug.........	414	0	293	528
Sept.*	381	0	262	496

*Preliminary.

Reflecting the rising consumption trend in the latex market is the report by RFC that demand for GR-S latex will reach a new high of about 4,318 long tons, dry weight, in November. There were no changes in prices for synthetic rubber latices during the market period.

Also, the difficulty in estimating just how fast *Hevea* latex consumption is increasing in the United States is highlighted by one usually reliable report that September consumption was 5,784 tons. The NPA preliminary estimate was 5,170 tons.

RECLAIMED RUBBER

DEMAND for reclaimed rubber was good during the period from October 16 to November 15, with the on-order position being the same as for the preceding month. A flurry of orders was noted after the elections, but the volume tapered off to more normal levels after a few days. Active demand continued for tire reclaims and for the miscellaneous grade of pure gum and tube reclaims; the latter types were stimulated by the scarcity and resultant high prices for flat bark grades in the natural rubber market. Battery box stocks are also enjoying good business, but a seasonal slackening is expected in the months ahead.

Final August and preliminary September statistics on the domestic reclaimed rubber industry are now available. August figures are: production, 17,131 long tons; imports, 60 long tons; consumption, 22,040 long tons; exports, 813 long tons; and month-end stock, 32,224 long tons. Preliminary September figures, in long tons, are: production, 21,947; imports, 93; consumption, 23,180; exports, 774; month-end stocks, 31,027.

No change occured in reclaim prices during the period for the more active grades, as listed below:

Reclaimed Rubber Prices

	Lb
Whole tire: first line.................	$0.10
Fourth line.........................	.0875
Inner tube: black.....................	.15
Red.................................	.22
Butyl...............................	.125
Pure gum, light colored..............	.23
Mechanical, light colored............	.135

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

SCRAP RUBBER

THE improvement in the scrap rubber market noted during the preceding month continued throughout the period from October 16 to November 15. Good demand for scrap was noted, following the upswing in reclaimed rubber activity. All grades of scrap were being purchased except for tire parts. A major portion of the business transacted was for tubes, but scrap dealers were showing some signs of withholding red auto tubes in the expectation of further price increases. Despite demand from reclaimers, the volume of scrap tire sales was only moderate because many dealers are unable or unwilling to meet reclaimers' requirements for a minimum of 30% bus and truck casings in each shipment of mixed tires.

The pick-up in scrap rubber activity brought price increases for all grades except tire parts. Prospects for the immediate future are believed to be good, since reclaimers were said still to be buying mainly for immediate requirements rather than for stockpiling. The forecast of a severe winter will do much to deplete recappers' stock of snow tires, thereby improving their demand for reclaim. Further support is also expected from the recent

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rises in crude rubber prices which should improve demand for reclaim by rubber goods manufacturers.

Following are dealers' selling prices for scrap rubber in carload lots, delivered to mills at the points indicated:

	Eastern Points		Akron, O.	
	(Per Net Ton)			
Mixed auto tires	\$9.50		\$13.50	
S. A. G. auto tires	Nom.		Nom.	
Truck tires	Nom.		12.00/	13.00
Peelings, No. 1	40.00		40.00	
2	Nom.		23.00	
3	Nom.		20.00	
	(¢ per Lb.)			
Auto tubes, mixed	3.00/	3.50	3.00/	3.50
Black	3.50	3.75	3.50	3.75
Red	9.00/	10.00	9.00/	10.00
Butyl	3.00		3.00	

COTTON AND FABRICS

New York Cotton Exchange Week-End Closing Prices

Futures	Sept. 27	Oct. 18	Oct. 25	Nov. 1	Nov. 8	Nov 15
Mar.	38.81	37.29	36.36	36.70	36.71	35.85
May	38.68	37.24	36.52	36.81	36.84	36.13
July	38.15	36.90	36.34	36.60	36.56	36.02
Oct.	35.93	35.20	34.98	35.05	34.96	34.74
Dec.	35.79	35.15	34.90	35.02	34.95	34.74
Mar.	35.60	35.10	34.93	35.10	34.94	34.74

THE downward trend in cotton prices on the New York Cotton Exchange first noted early in October continued throughout the period from October 16 to November 15. Demand for cotton from the mills was slow; export business failed to materialize to any great extent; supplies of cotton were large, and spot values remained at discounts under futures prices to create a favorable pattern for hedging.

The general market pattern was one of hesitancy in view of estimates for a large new crop. A further blow to the market was dealt by the government's November 10 crop estimate of 14,905,000 bales, or nearly 1,500,000 bales more than forecasts of domestic and export demands for the current marketing year.

The 15/16-inch middling cotton spot price began the period at a high of 37.40¢, then fell irregulary to end at a low of 35.65¢ on November 14. March futures began at 37.38¢ on October 16, rose above the spot level as hedging increased to reach a high of 37.33¢ on October 20, and dropped to close the period at a low of 35.85¢.

Fabrics

Demand for cotton industrial goods was spotty during the period from October 16 to November 15. Medium-volume sales were made only in flurries and were concentrated in certain constructions. Toward the end of the period, after fairly widespread price reductions had been made, an improvement in demand was noted. While this pick-up in activity was still moderate in scope, trade observers believe that consumers are now beginning to cover their foreseeable needs. Various types of ducks were sold in substantial volume into early next year, and wide drills are pretty much sold out through March. Hose and belting ducks, enameling ducks, and chafers also showed a more active trading tempo with sales made into January.

Cotton Fabrics

Drills

59-inch 1.85-yd. *yd.*	\$0.395	/ \$0.41
2.25-yd	.35	/ .36

Osnaburgs

40-inch 2.11-yd *yd.*	.25
3.65-yd	.16

Ducks

38-inch 1.78-yd S. F. *yd.*	\$0.32	
2.00-yd D. F.	.355	
51.5-inch, 1.35-yd. S. F.	.515	
Hose and belting	.75	

Raincoat Fabrics

Print cloth, 38½-inch, 64x60 *yd.*	.1575	
Sheeting, 48 inch, 4.17-yd	.22⅜	/ \$0.225
52-inch 3.85-yd	.245	

Chafer Fabrics

14-oz./sq. yd. Pl. *lb.*	.76
11.65-oz./sq. yd. S.	.68
10.80-oz./sq. yd. S.	.72
8.9-oz./sq. yd. S.	.735

Other Fabrics

Headlining, 68-inch 1.35-yd., 2-ply *yd.*	nom.
68-inch, 1.25-yd. 2-ply	.67
Sateens, 53-inch 1.32-yd	.60
58-inch 1.21-yd	.655

Tire Cords

K. P. std., 12-4-2 *lb.*	.85

RAYON

TOTAL October shipments of all types of rayon and acetate by domestic producers amounted to 100,900,000 pounds, 7% below the September total, but 22% above that of October, 1951. Of this October total, 34,500,000 pounds were of viscose high-tenacity yarn, an increase of 200,000 pounds over the preceding month's figure. Calculated production of high-tenacity yarn during October was 33,800,000 pounds, or 92% of capacity, and month-end stocks were 4,600,000 pounds.

The last emergency control in the textile industry was revoked on October 17 when NPA cancelled Regulation M-13. Originally issued on December 2, 1950, the order limited the amount of DO-rated orders for high-tenacity yarn that any producer was obliged to accept to 10% of scheduled monthly production. This percentage was raised to 30% by successive amendments and was finally revoked because DO-rated business now being placed with the industry is of minor importance.

Third-quarter shipments of rayon yarn for use in tires and related products amounted to 103,400,000 pounds, an increase of 900,000 pounds over the second-quarter figure. Of the 300,300,000 pounds shipped during the first nine months of this year, it is estimated that 290,600,000 pounds went into tires; while the remainder was used in hose and belting.

No changes were made in rayon tire yarn and fabric prices during the period from October 16 to November 15, and current prices follow:

Rayon Prices

Tire Yarns

1100/480	\$0.63
1100/490	.62
1150/490	.62
1650/720	.62
1650/980	.61
1900/980	.61
2200/960	.61
2200/980	.60
4400/2934	.63

Tire Fabrics

1100/490/2		.72
1650/980/2	\$0.659 /	.73
2200/980/2		.685

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Estimated Automotive Pneumatic Casings and Tubes Shipments, Production, Inventory—September, August, 1952; First Nine Months, 1952, 1951

Passenger Casings	Sept., 1952	% of Change from Preceeding Month	Aug., 1952	First Nine Months, 1952	First Nine Months, 1951
Shipments					
Original equipment	2,349,221		1,311,756	16,833,714	21,204,209
Replacement	4,225,136		5,335,845	37,061,313	26,570,054
Export	91,298		84,526	558,393	509,516
Total	6,665,655	−0.99	6,732,127	54,453,420	48,283,779
Production	6,197,048	+4.55	5,927,182	54,665,303	48,902,223
Inventory end of month	7,296,715	−6.27	7,785,069	7,296,715	3,604,798
Truck and Bus Casings					
Shipments					
Original equipment	476,327		320,236	3,868,254	4,204,003
Replacement	856,630		890,262	6,495,977	7,706,737
Export	49,942		46,529	625,549	599,749
Total	1,382,899	+10.01	1,257,027	10,989,780	12,510,489
Production	1,193,582	+18.69	1,005,640	11,864,662	12,915,838
Inventory end of month	2,663,319	− 6.61	2,851,786	2,663,319	1,134,880
Total Automotive Casings					
Shipments					
Original equipment	2,825,548		1,631,992	20,701,968	25,408,212
Replacement	5,081,766		6,226,107	43,557,290	34,276,791
Export	141,240		131,055	1,183,942	1,109,265
Total	8,048,554	+ 0.74	7,989,154	65,443,200	60,794,268
Production	7,390,630	+ 6.60	6,932,822	66,529,965	61,818,061
Inventory end of month	9,960,034	− 6.36	10,636,855	9,960,034	4,739,678
Passenger Including Motorcycle and Truck and Bus Tubes					
Shipments					
Original equipment	2,819,854		1,638,420	20,696,225	25,410,605
Replacement	3,066,479		3,706,000	26,530,314	25,455,455
Export	97,964		86,496	846,560	678,506
Total	5,984,297	+10.19	5,430,916	48,073,099	51,544,566
Production	5,396,954	+10.89	4,867,085	48,058,618	50,336,113
Inventory end of month	10,085,670	− 5.10	10,627,482	10,085,670	6,830,916

Note: Cumulative data on this report include adjustments made in prior months.
Source: The Rubber Manufacturers Association, Inc., New York, N. Y.

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COMPOUNDING INGREDIENTS*

Abrasives

Pumicestone, powdered	lb.	$0.025	$0.0425
Rottenstone, domestic	lb.	.0175	.02

Accelerators, Organic

A-10	lb.	.40	.47
A-19	lb.	.52	.58
A-32	lb.	.61	.68
A-77	lb.	.47	.60
A-100	lb.	.47	.60
Accelerator 8	lb.	1.015	
49	lb.	.495	.505
552	lb.	2.07	
808	lb.	.61	.63
833	lb.	1.17	1.19
Altax	lb.	.435	.46
Arazate	lb.	2.235	
Beutene	lb.	.61	.66
Bismate	lb.	3.00	
B-J-F	lb.	.27	.32
Butasan	lb.	1.035	
Butazate	lb.	1.035	
Butyl Accelerator 21	lb.	.875	.88
Eight	lb.	1.10	1.35
Zimate	lb.	1.035	
Captax	lb.	.34	.36
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Cuprax	lb.	.60	.62
Diesterex N	lb.	.50	.57
DOTG (diorthotolyguanidine)	lb.	.52	.55
DPG (diphenylguanidine)	lb.	.43	.505
El-Sixty	lb.	.465	.535
Ethasan	lb.	1.035	
Ethazate	lb.	1.035	
Ethyl Thiurad	lb.	1.035	
Tuads	lb.	1.035	
Tuex	lb.	1.035	
Zimate	lb.	1.035	
Ethylac	lb.	.91	.93
Good-rite Erie	lb.	.35	.37
Hepteen	lb.	.435	.495
Base	lb.	1.80	1.90
Ledate	lb.	1.00	
M-B-T	lb.	.35	.40
-XXX	lb.	.455	.475
M-B-T-S	lb.	.42	.485
Merac	lb.	.75	1.03
Mertax	lb.	.455	.525
Methasan	lb.	1.035	
Methazate	lb.	1.035	
Methyl Tuads	lb.	1.135	
Zimate	lb.	1.035	
Monex	lb.	1.135	
Mono-Thiurad	lb.	1.135	
Morfex	lb.	.61	.66
NOBS No. 1	lb.	.68	.70
O-X-A-F	lb.	.445	.495
Pentex	lb.	1.035	
Flour	lb.	.20	
Permalux	lb.	2.17	
Phenex	lb.	.49	.54
Pip-Pip	lb.	2.07	
R-2 Crystals	lb.	2.20	
Rotax	lb.	.455	.475
S. A. 52	lb.	1.135	
57, 62, 67, 77	lb.	1.035	
66	lb.	1.50	
Santocure	lb.	.68	.75
Selenac	lb.	1.50	
Setsit No. 5	lb.	.75	1.05
SPDX-GH	lb.	.64	.69
GL	lb.	.95	
Tellurac	lb.	1.45	
Tepidone	lb.	.45	.48
Tetrone A	lb.	1.91	
Thiocarbanilide (A-1)	lb.	.48	.55
Thiofide	lb.	.435	.505
S	lb.	.465	.535
Thionex	lb.	1.135	
Thiotax	lb.	.35	.42
Thiurad	lb.	1.135	
Thiuram E	lb.	1.035	
M	lb.	1.135	
Trimene	lb.	.56	.66
Base	lb.	1.03	1.18
Tuex	lb.	1.135	
2-MT	lb.	.775	
Ultex	lb.	1.00	1.10
Unads	lb.	1.135	
Ureka Base	lb.	.66	.73
Z-B-X	lb.	2.45	
Zenite	lb.	.435	.455
A	lb.	.515	.535
Special	lb.	.445	.465
Zetax	lb.	.445	.465

Accelerator-Activators, Inorganic

Lime, hydrated	ton	10.00	17.50
Litharge, comml.	lb.	.1675	.1735
Eagle, sublimed	lb.	.1675	.1685
National Lead	lb.	.1725	.1735
Red Lead, comml.	lb.	.1725	.1875
Eagle	lb.	.1775	
National Lead	lb.	.1825	
White lead, basic	lb.	.1625	.1725
Eagle, National Lead	lb.	.1625	.1725
White lead, silicate	lb.	.15	.1925
Eagle	lb.	.175	.1925
National Lead	lb.	.15	.16
Zinc oxide, comm.†	lb.	.1425	.175

Accelerator-Activators, Organic

Aktone	lb.	$0.22	$0.23
Barak	lb.	.62	
Curade	lb.	.57	.59
D-B-A	lb.	1.95	
Delac P	lb.	.45	.52
Emersol 110	lb.	.115	.1275
120	lb.	.12	.1325
130	lb.	.1425	.155
210 Elaine	lb.	.1175	.1475
Emery 600	lb.	.095	.125
Guantal	lb.	.55	.62
Hyfac 430	lb.	.14	.1525
431	lb.	.16	.1725
Laurex	lb.	.30	.33
MODX-B	lb.	.295	.345
NA-22	lb.	1.50	
Palmalene	lb.	.35	
Plastone	lb.	.27	.30
Polyac	lb.	1.655	
Ridacto	lb.	.25	.26
Seedine	lb.	.1485	.1705
SOAC-KL	lb.	.065	.09
Stearex Beads	lb.	.14⅞	.15⅞
Stearic acid, single pressed	lb.	.115	.1275
Double pressed	lb.	.12	.1325
Triple pressed	lb.	.1425	.155
Stearite	lb.	.095	.10
Tonox	lb.	.515	.605
Zinc stearate	lb.	.37	.39

Alkalies

Caustic soda, flake	100 lbs.	3.75	6.77
Liquid, 50%	100 lbs.	2.55	2.75
Solid	100 lbs.	3.35	5.05

Antioxidants

AgeRite Alba	lb.	2.275	2.375
Gel	lb.	.62	.64
H.P.	lb.	.695	.715
Hipar	lb.	.94	.96
Powder	lb.	.505	.525
Resin	lb.	.67	.69
D	lb.	.505	.525
Stalite	lb.	.505	.525
White	lb.	1.45	1.55
Akroflex C,	lb.	.695	.715
Albasan	lb.	.69	.73
Aminox	lb.	.505	.595
Antioxidant 2246	lb.	1.65	1.68
Antisol	lb.	.23	.24
Antox	lb.	.505	.525
Aranox	lb.	3.25	
Betanox Special	lb.	.725	.815
B-L-E, -25	lb.	.505	.595
Burgess Antisun Wax	lb.	.185	
B-X-A	lb.	.505	.595
Copper Inhibiter X-872-L	lb.	2.105	
Flectol H	lb.	.505	.575
Flexamine	lb.	.695	.785
Heliozone	lb.	.26	.27
Ionol	lb.	.91	1.40
NBC	lb.	1.55	
Neozone A	lb.	.525	.545
C	lb.	.695	
D	lb.	.505	.525
Octamine	lb.	.505	.595
Perflectol	lb.	.61	.68
Rio Resin	lb.	.54	.56
Santoflex 35	lb.	.695	.765
AW	lb.	.75	.82
B	lb.	.505	.575
BX	lb.	.62	.69
Santovar A	lb.	1.50	1.57
O	lb.	1.30	1.37
Santowhite Crystals	lb.	1.60	1.67
L	lb.	.505	.575
MK	lb.	1.29	1.36
S.C.R.	lb.	.32	.34
Sharples Wax	lb.	.23	.28
Stabilite	lb.	.53	.57
Alba	lb.	.72	.79
L	lb.	.60	.64
White	lb.	.53	.62
Powder	lb.	.41	.47
Sunolite	lb.	.20	
Sunproof	lb.	.25	.30
Improved	lb.	.23	.28
Jr.	lb.	.18	.23
Thermoflex A	lb.	.98	1.00
Tonox	lb.	.50	.5975
Tysonite	lb.	.24	.24
V-G-B	lb.	.67	.76
Wing-Stay S	lb.	.495	.505
Zenite	lb.	.33	.35

Antiseptics

Copper naphthenate, 6-8%	lb.	.2275	
Pentachlorophenol	lb.	.21	.29
Resorcinol, technical	lb.	.825	.835
Zinc naphthenate, 8-10%	lb.	.235	.285

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxide.

‡At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

Blowing Agents

Ammonium, bicarbonate	lb.	$0.06	$0.07
Carbonate	lb.	.23	.24
Blowing Agent CP-975	lb.	.35	
Celogen	lb.	1.95	
50-C	lb.	1.01	
Sodium bicarbonate	100 lbs.	2.10	3.15
Carbonate, tech.	100 lbs.	1.20	5.02
Unicel	lb.	.82	
ND	lb.	1.11	
S	lb.	.20	

Bonding Agents

G-E Silicone Paste SS-15	lb.	4.52	5.10
SS-64	lb.	3.65	6.75
-67 Primer	lb.	7.50	12.50
Gen-Tac Latex	lb.	.75	.855
Kalabond Adhesive	gal.	6.50	16.00
Tie Cement	gal.	2.00	5.60
MDI	lb.	4.00	6.00
-50	lb.	2.00	3.00
Thixons	gal.	1.48	12.00
Ty-Ply BN, Q, S, 3640	gal.	6.75	8.00

Brake Lining Saturants

B.R.T. No. 3	lb.	.024	.025
Resinex L-S	lb.	.0225	.03

Carbon Blacks‡

Conductive Channel—CC

Continental R-20	lb.	.15	.22
R-40	lb.	.18	.24
Kosmos/Dixie BB	lb.	.195	.25
Spheron C	lb.	.14	.185
N	lb.	.25	.30
Voltex	lb.	.18	.315

Easy Processing Channel—EPC

Continental AA	lb.	.074	.1225
Kosmobile 77/Dixiedensed 77	lb.	.074	.1225
Micronex W-6	lb.	.074	.1225
Spheron #9	lb.	.074	.1225
Texas E	lb.	.074	.1175
Witco #12	lb.	.074	.1225
Wyex	lb.	.074	.12

Hard Processing Channel—HPC

Continental F	lb.	.074	.1225
HX	lb.	.074	.12
Kosmobile S/Dixiedensed S	lb.	.074	.1225
Micronex Mk. II	lb.	.074	.1225
Spheron #4	lb.	.074	.1225
Witco #6	lb.	.074	.1225

Medium Processing Channel—MPC

Arrow TX	lb.	.074	.12
Continental A	lb.	.074	.1225
Kosmobile S-66/Dixiedensed S-66	lb.	.074	.1225
Micronex Standard	lb.	.074	.1225
Spheron #6	lb.	.074	.1225
Texas M	lb.	.074	.1175
Witco #1	lb.	.074	.1225

Fast Extruding Furnace—FEF

Arovel	lb.	.06	.10
Kosmos 50/Dixie 50	lb.	.06	.10
Statex M	lb.	.06	.10
Sterling SO	lb.	.06	.10

Fine Furnace—FF

Statex B	lb.	.065	.105
Sterling 99	lb.	.065	.105

High Abrasion Furnace—HAF

Aromex	lb.	.079	.125
Continex HAF	lb.	.079	.125
Kosmos 60/Dixie 60	lb.	.079	.1175
Philblack O	lb.	.079	.119
Statex R	lb.	.079	.125
Vulcan #3	lb.	.079	.122

Medium Abrasion Furnace—MAF

Philblack A	lb.	.06	.10

Super Abrasion Furnace—SAF

Philblack E	lb.	.135	.175
Statex 125	lb.	.11	.155

General-Purpose Furnace—GPF

Sterling V	lb.	.05	.09

High Modulus Furnace—HMF

Continex HMF	lb.	.055	.095
Kosmos 40/Dixie 40	lb.	.055	.095
Modulex	lb.	.055	.095
Statex 93	lb.	.055	.095
930	lb.	.055	.095
Sterling L, LL	lb.	.055	.095

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE • RATES ON REQUEST

SITUATIONS OPEN

FOAM RUBBER. RAPIDLY EXPANDING MANUFACTURER OF foam rubber is in need of compounders experienced in development and control of the latex foam process, and also of production men with a technical background. Please give full particulars including age, experience, and desired salary in your first reply. Our employes have been notified of this advertisement. Address Box No. 1191, care of INDIA RUBBER WORLD.

SUPERINTENDENT REQUIRED FOR MODERN FABRIC spreading plant located in eastern part of New York State. Experienced in commercial and government specification work with natural and synthetic rubber. Excellent position for right man. Please give experience and desired salary. Address Box No. 1192, care of INDIA RUBBER WORLD.

MOLD AND/OR DIE DESIGNER

A Midwest rubber and plastics company is interested in acquiring the services of an experienced rubber mold or plastics die designer. The individual selected for this position will be responsible for the design, storage, and maintenance of all molds and dies. He will supervise those people now engaged in this activity.

If you are a graduate engineer or have equivalent experience and feel you can qualify for this position, please write to the box indicated below stating your experience, age, education, approximate salary expected, etc. Please enclose a recent photograph if possible. Address Box No. 1193, care of INDIA RUBBER WORLD.

WELL-ESTABLISHED MIDWESTERN MECHANICAL RUBBER goods manufacturer requires man qualified to take charge of molding department. Write giving age and experience in detail. All replies confidential. Address Box No. 1194, care of INDIA RUBBER WORLD.

A REAL OPPORTUNITY IN RUBBER MANUFACTURING

WANTED

COST ESTIMATOR with extruded goods processing experience. Some miscellaneous molded goods experience helpful, but not necessary.

ALSO

EXTRUDED GOODS PROCESSING MAN to work with extruded goods Superintendent.

Our company is well established, young, and expanding our Extruding Department. We are located in a small Michigan city 70 miles from Detroit. Our employes know of this ad.

Address Box No. 1195, care of INDIA RUBBER WORLD.

LATEX CHEMIST—COMPOUND DEVELOPMENT IN SYNTHETICS, adhesives, and coating. Experience preferred, but not essential. Excellent opportunity in growing concern, Midwest location. Address Box No. 1196, care of INDIA RUBBER WORLD.

RUBBER CHEMIST—COMPOUNDER WITH APPROXIMATELY five years' experience for eastern mechanical rubber goods manufacturer of hose, belting, and molded goods. Duties will include research, development, and production compounding. Please state experience, education, salary required, and send small photo. Address Box No. 1206, care of INDIA RUBBER WORLD.

RUBBER CHEMISTS. WANTED BY LARGE NEW ENGLAND manufacturer Rubber Chemists experienced in latex technology. Men with several years' experience in technical work in the proofing of fabrics or in industrial rubber products or hard rubber manufacture. Address Box No. 1207, care of INDIA RUBBER WORLD.

MECHANICAL OR CHEMICAL ENGINEERING GRADUATE with experience in mechanical synthetic rubber goods mold design with background of production techniques. Five years' experience. Permanent job, well-established firm. Experience with Silicones and GR-S is desirable but not mandatory. Address Box No. 1208, care of INDIA RUBBER WORLD.

WANTED: DEVELOPMENT CHEMIST WITH EXPERIENCE IN chemically blown sponge rubber. Excellent opportunity with small expanding company in New England. State qualifications and salary expected. Address Box No. 1215, care of INDIA RUBBER WORLD.

SPONGE CHEMIST

Experienced in chemically-blown products for lab and factory operations. Real opportunity. All replies confidential.

Address Box No. 1168, % INDIA RUBBER WORLD

Chemical Engineer or Chemist with experience in compounding and processing of synthetic and natural rubber. Position available requires this background to qualify for technical service and promotional activities with major chemical company servicing the rubber industry. Applicant with technical service experience is preferred—replies will be held strictly confidential.

ADDRESS BOX No. 1190, c/o INDIA RUBBER WORLD

SITUATIONS OPEN (Continued)

RUBBER COMPOUNDER

A real connection for an experienced compounder of extruded rubber goods. Location in the East with strong and going firm operating internationally. It will pay you to investigate.

Address Box No. 1189, c/o INDIA RUBBER WORLD

RUBBER CHEMIST FOR MIDWESTERN FACTORY, EXPERIENCE required in high-grade hard rubber compounding of compression molded and hand-wrapped products. Will have charge of Product Control of entire factory, with assistant to aid in detail work. Kindly furnish résumé of experience, salary, etc. Reply will be held in strict confidence. Address Box No. 1209, care of INDIA RUBBER WORLD.

WANTED: RUBBER SALES TECHNOLOGIST. WESTERN MANUFACTURER and Sales Representative has opening in Los Angeles office for Technical Sales Representative to call on Rubber, Paint, and Plastic Manufacturers. Previous sales experience desired. College degree. Write giving in full detail age, education, and experience. Replies held in strict confidence. Address Box No. 1210, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

PRODUCT DEVELOPMENT, RESEARCH MANAGER, CHEMIST having 30 years' experience in development and application of all plastic and rubber materials, latex, pressure-sensitives, fabric coatings, paper coating, plastic molding, and allied lines. Consulting experience, excellent chemical, mechanical background. Available short notice. Address Box No. 1197, care of INDIA RUBBER WORLD.

SEEKING OPPORTUNITY, BUSINESS OR TECHNICAL. EXCELLENT broad experience as rubber chemist, lab and plant; management of small business, new product promotion, advertising; personnel supervision. Prefer coastal location, South or West. Travel anywhere. Address Box No. 1198, care of INDIA RUBBER WORLD.

RUBBER TECHNICIAN, DESIRES TO RELOCATE. OVER twenty years' experience in the wire and cable industry. Experience includes development and compounding, rubber and plastic extruding, laboratory control, factory control. Can handle people, laboratory, and factory coordination. Reliable and steady. Address Box No. 1199, care of INDIA RUBBER WORLD.

TECHNICAL MAN WITH TWENTY YEARS OF CHEMISTRY and experience in the plastic and rubber industry desires position with a medium-size or small company as superintendent or assistant factory manager. Fully qualified in compounding, development, and manufacturing, also familiar with factory processing and plant engineering. Address Box No. 1200, care of INDIA RUBBER WORLD.

CHIEF LATEX CHEMIST, 33, 14 YEARS' EXPERIENCE COMPOUNDING natural and synthetic latices for adhesives, jar closures, dipped goods, slush molding, curled hair fibre binders, latex thread, rug backings, foam sponge, etc. Production, compounding, and preparation of finished products. Considerable technical sales and service. Prefer technical sales. Address Box No. 1211, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—BALL & JEWELL NO. 1½ ROTARY CUTTER, stainless steel. 3 Mikro pulverizers #1-SH, #2-SI, #2-TH. 2 Kux rotary pellet presses. 6 Stokes rotary pellet presses. Read 600 lb. jacketed ribbon mixer. Large stock stainless steel tanks and kettles. PERRY EQUIPMENT CORP., 1424 N. 6th St., Philadelphia 22, Pa.

1—64" CALENDER, THREE ROLL: 1—60" MILL: 1—54" MILL; 1—40" Mill: 2—60" Rubber Spreaders: 12—200-gal. Churns: 2—40-gal. Pony Mixers: 1—8-gal. Pony Mixer: 3—Embossing Calenders; 2—Dinking Machines: 1—Clicking Machine: 1—Hydraulic Rubber Cutter; 1—Gruender Hammer Mill: 1—Craig Dry Spray Unit; 2—Hydraulic Presses; 1—Experimental Mill; 2—24" Mills: 8" x 18" Outsole Calender; 3—Double-Arm Jacketed Mixers: #2 Royle Tubers. Address Box No. 1202, care of INDIA RUBBER WORLD.

FOR SALE: ONE HYDRAULIC PRESS 24 X 30" STEAM platens, 4 openings, 11" diameter ram with one Baldwin Southwark Triplex high-pressure pump, capacity ten gallons per minute, cylinder bore 1¼" and 5" stroke, with 15 H.P. motor, 440 volt, 900 R.P.M. that can handle two or more additional presses. Address Box No. 1204, care of INDIA RUBBER WORLD.

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	$0.04	/ $0.08
Essex	lb.	.04	.08
Furnex	lb.	.04	.08
Gastex	lb.	.045	.085
Kosmos 20/Dixie 20	lb.	.04	.08
Pelletex	lb.	.04	.08
Sterling NS, S	lb.	.04	/ .08

Fine Thermal—FT

P-33	lb.	.055	

Medium Thermal—MT

Thermax	lb.	.035	
Stainless	lb.	.045	

Chemical Stabilizers

Advastab-21	lb.	1.06	/ 1.12
Dutch Boy DS-207	lb.	.53	/ .55
Dyphos	lb.	.56	/ .58
Dythal	lb.	.40	/ .42
Normasal	lb.	.45	/ .47
Plumb-O-Sil A	lb.	.2875	/ .3075
B	lb.	.3025	/ .3225
C	lb.	.3325	/ .3525
Tribase	lb.	.265	/ .285
E	lb.	.235	/ .255
Stabelans	lb.	.60	/ 1.70
Stabilizer #3, #52	lb.	2.10	/ 2.20
#143	lb.	.80	/ .90
B-5	lb.	.70	/ .75
BC-12	lb.	.90	/ .95
CH-14	lb.	.65	/ .70
E-6-B	lb.	.90	/ 1.00
JCX	lb.	.67	/ .76
L Paste	lb.	.60	/ .65
SN	lb.	.47	/ .53
V-I-N	lb.	.42	/ .50
Dry Powder	lb.	.75	/ .80
V-9	lb.	.85	/ .90
VL-2	lb.	1.26	/ 1.32
-3	lb.	1.17	/ 1.23
Vanstay H	lb.	.75	/ .77
HH	lb.	.98	
L	lb.	.33	/ .35
Witco Lead Stearate #50	lb.	.56	
Stabilizer #70	lb.	.70	

Colors

Black

Black Paste #25	lb.	.22	/ .40
BK Iron Oxides	lb.	.1175	/ .12
Covinyblaks	lb.	.62	/ 1.14
Lampblack, comml	lb.	.16	/ .45
Superjet	lb.	.0825	/ .1175
Mapico	lb.	.1175	/ .12
MB Mineral Blacks	lb.	.0315	/ .0675
Stan-Tone	lb.	.45	/ 1.20

Blue

Du Pont	lb.	1.77	/ 4.55
Heveatex pastes	lb.	.80	/ 1.45
Stan-Tone	lb.	1.55	/ 1.60
Toners	lb.	.30	/ 3.50

Brown

Brown Paste #5, #10	lb.	.35	/ .45
Mapico	lb.	.1275	/ .13
Tan	lb.	.1975	/ .20
Metallic brown	lb.	.035	/ .045
Plastics brown	lb.	.0625	/ .07
Sienna, burnt	lb.	.0425	/ .155
Raw	lb.	.045	/ .1325
Umber, burnt	lb.	.06	/ .065
Raw	lb.	.0625	/ .065

Green

Chrome	lb.	.17	/ .40
Oxide	lb.	.375	/ 1.20
Du Pont	lb.	1.85	/ 3.20
G-4099, -6099	lb.	.34	/ .345
7599	lb.	.405	/ .41
GH-9869	lb.	.85	/ 1.00
9976	lb.	.95	/ 1.10
Heveatex pastes	lb.	.95	/ 1.85
Stan-Tone	lb.	1.75	/ 4.60
Toners	lb.	.35	/ 4.00

Orange

Du Pont	lb.	2.75	
Orange Paste #13	lb.	1.35	/ 1.50
Stan-Tone	lb.	.70	/ 3.35
Toners	lb.	.30	/ 1.50

Red

Antimony trisulfide	lb.	.72	/ .78
R. M. P. No. 3	lb.	.72	/
Sulfur Free	lb.	.78	/
Cadmium red lithopone	lb.	1.61	/ 1.85
Cadmolith	lb.	1.72	/ 2.05
Du Pont	lb.	1.32	/ 1.80
Indian Red	lb.	.1225	/ .125
Iron oxide, red	lb.	.0575	/ .125
Mapico	lb.	.1225	/ .125
Red Paste #17, I-2	lb.	.95	/ 1.10
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	1.05	/ 4.05
Toners	lb.	.25	/ 4.15

White

Antimony oxide	lb.	$0.30	/ $0.375
Burgess Iceberg	ton	50.00	
Lithopone, titanated	lb.	.10	/ .11
Cryptone BT	lb.	.10	/ .11
Titanium pigments			
Rayox LW	lb.	.195	/ .205
R-110	lb.	.215	/ .225
Ti-Cal	lb.	.075	/ .0825
Ti-Pure	lb.	.195	/ .225
Titanox A-168,-LO,-MO	lb.	.21	/ .22
RA, RA-10	lb.	.23	/ .24
RCHT	lb.	.08	/ .085
Zopaque	lb.	.21	/ .22
Zinc oxide, comml.	lb.	.1425	/ .175
Azo ZZZ-11, -44, -55	lb.	.1425	/ .1525
35% leaded	lb.	.144	/ .154
50% leaded	lb.	.145	/ .155
Eagle AAA, lead free	lb.	.1425	/ .1525
5% leaded	lb.	.1425	/ .1525
35% leaded	lb.	.144	/ .154
50% leaded	lb.	.145	/ .155
Florence Green Seal	lb.	.16	/ .17
Red Seal	lb.	.155	/ .165
White Seal	lb.	.165	/ .175
Horsehead XX-4, -78	lb.	.1425	/ .1525
Kadox-15, -17, -22	lb.	.1425	/ .1525
-25	lb.	.165	/ .175
Lehigh, 35% leaded	lb.	.144	/ .154
50% leaded	lb.	.145	/ .155
Protox-166, -167	lb.	.1425	/ .1525
St. Joe, lead free	lb.	.1425	/ .1525
Zinc sulfide, comml.	lb.	.253	/ .263
Cryptone ZS	lb.	.253	/ .263

Yellow

Cadmium yellow lithopone	lb.	1.20	/ 1.21
Cadmolith	lb.	1.29	/ 1.37
Chrome	lb.	.31	/ .33
Du Pont	lb.	1.62	/ 2.15
Iron oxide, yellow	lb.	.0141	/ .1025
Mapico	lb.	.10	/ .1025
Stan-Tone	lb.	1.00	/ 1.55
Toners	lb.	.50	/ 1.37
Yellow D	lb.	1.25	/ 1.35

Dispersing Agents

Darvan Nos. 1, 2	lb.	.22	/ .30
Daxads	lb.	.08	/ .35
Kreelons	lb.	.15	/ .16
Modicols	lb.	.17	/ .58
Triton R-100	lb.	.12	/ .25

Dusting Agents

Extrud-o-Lube, conc.	gal.	1.54	
Glycerized Liquid, Lubricant, concentrated	gal.	1.48	
Lubrex	lb.	.25	/ .30
Mica	lb.	.07	/ .0775
Polymel D-Tac	lb.	.21	/ .22
Pyrax A	ton	13.50	
W. A.	ton	16.00	
Snow Crest Talc	ton	33.00	/ 35.00
Vanfre	gal.	2.00	/ 2.50

Extenders

Advagum 1098	lb.	.61	/ .69
B. R. S. 700	lb.	.0175	/ .026
B. R. T. No. 7	lb.	.0265	/ .0275
Burgess MX-50	ton	150.00	
Car-Bel-Ex A	lb.	.14	
Dielex B	lb.	.06	
Factice, Amberex	lb.	.29	/ .36
Brown	lb.	.1425	/ .268
Neophax	lb.	.157	/ .268
White	lb.	.144	/ .285
Mineral Rubbers			
Black Diamond	ton	38.00	/ 40.00
Extender 600	lb.	.185	
Hard Hydrocarbon	ton	46.50	/ 48.50
No. 38	ton	38.00	/ 40.00
Parmr	ton	21.00	/ 29.00
Nuba No. 1, 2	lo.	.0575	/ .0625
3X	lb.	.0775	/ .0825
Polymel Sublac Resins	lb.	.26	/ .30
Rubber substitute, brown	lb.	.137	/ .2625
White	lb.	.156	/ .292
Stan-Shells	ton	35.00	/ 73.00
Synthetic 100	lb.	.41	

Fillers, Inert

Barytes, floated, white	ton	37.60	/ 61.75
Off-color, domestic	ton	19.00	/ 20.00
No. 1	ton	37.60	/ 53.60
2	ton	35.60	/ 51.60
Blanc fixe	ton	90.00	/ 130.00
Clays			
Aiken	ton	14.00	
Albacar	ton	50.00	/ 55.00
Aluminum Flake	ton	16.00	/ 22.00
#5	ton	21.00	
Champion	ton	14.00	
Crown	ton	14.00	/ 33.00
GK Soft Clay	ton	11.00	
Hi-White R	ton	13.50	/ 33.00
Hydratex R	ton	28.00	
Paragon	ton	13.50	/ 31.50
McNamee	ton	13.50	
RX-43	ton	33.00	
Stan-Clay	ton	28.00	
Stellar-R	ton	50.00	
Suprex	ton	14.00	/ 33.00
W-1291 English	ton	53.00	/ 55.00
Witco #1	ton	14.00	/ 30.00
#2	ton	13.50	/ 30.00
Cryptone BA, CB, MS	lb.	$0.08	/ $0.0825
Flocks			
Cotton, dark	lb.	.095	/ .112
Dyed	lb.	.55	/ .60
White	lb.	.13	/ .33
Fabrifil X-24-G	lb.	.095	
X-24-W	lb.	.135	
Filfloc 6000	lb.	.16	
F-40-900	lb.	.105	
Solka-Floc	lb.	.07	/ .16
Kalite	ton	50.00	/ 65.00
Lithopone, comml.	lb	.075	/ .085
Albalith	lb.	.075	/ .085
Astrolith	lb.	.06⅜	/ .0675
Eagle	lb.	.0725	/ .075
Sunolith	lb.	.079	/ .089
Mica	lb.	.07	/ .0775
Millical	ton	32.50	/ 47.50
No. 1 Silica	ton	22.00	/ 40.00
Non-Fer-Al	ton	25.00	/ 40.00
Purecal D	ton	50.00	/ 65.00
M	ton	45.00	/ 65.00
T	ton	110.00	/ 125.00
Pyrax A	ton	12.50	
W. A.	ton	15.00	
SL Slate Flour	ton	17.00	/ 25.00
Stan-White	ton	8.50	/ 9.45
Super-White Silica	ton	23.00	/ 42.00
Suspenso	ton	30.00	/ 45.00
Terra Alba 1319	ton	27.00	
Ti-Cal	lb.	.0675	
Whiting, limestone	ton	6.00	/ 15.00
Calcite	ton	20.00	
Paxinosa	ton	10.00	/ 18.00
Witco	ton	8.50	

Finishes

Black-out	gal.	4.50	/ 8.00
Flocks			
Cotton, dark	lb.	.095	/ .112
Dyed	lb.	.55	/ .60
White	lb.	.13	/ .33
Rayon, colored	lb.	.90	/ 1.50
White	lb.	.75	/ 1.25
Rubber lacquer, clear	gal.	1.00	/ 2.00
Colored	gal.	2.00	/ 3.50
Shoe varnish	gal.	1.45	
Talc	ton	14.00	/ 35.00
Nytals	ton	25.00	/ 36.00
Wax, Bees	lb.	.47	/ .70
Carnauba	lb.	.94	/ 1.26
Montan	lb.	.125	/ .32
No. 118, colors	gal.	.86	/ 1.41
Neutral	gal.	.76	/ 1.31
Van Wax	gal.	1.45	/ 1.50

Latex Compounding Ingredients

Accelerator 552	lb.	2.07	
J-127, -132	lb.	1.00	/ 1.15
Aerosol	lb.	.35	
AgeRite Dispersions	lb.	.60	/ 2.25
Alcogum AN-10	lb.	.085	
Amberex Solutions	lb.	.1675	/ .18
Antifoam J-114	lb.	3.25	/ 3.45
P-242	lb.	.24	/ .35
Antioxidant J-105	lb.	1.90	/ 2.05
-126, -139	lb.	1.45	/ 1.60
-137, -140	lb.	.55	/ .70
-138	lb.	1.05	/ 1.20
-191	lb.	1.10	/ 1.20
Anti-Webbing Agent X-452	lb.	.75	/ .90
Aquablaks	lb.	.08	/ .1775
Aquarex D	lb.	.80	
G	lb.	.21	
L	lb.	.94	
MDL	lb.	.33	
ME	lb.	.97	
NS	lb.	.60	
SMO	lb.	.50	
WAQ	lb.	.28	
Areskap 50	lb.	.30	/ .38
100, dry	lb.	.60	/ .72
Aresket 240	lb.	.30	/ .38
300, dry	lb.	.60	/ .72
Aresklene 375	lb.	.42	/ .57
Black No. 25, dispersed	lb.	.22	
Casein	lb.	.275	/ .385
Coagulant P-379	gal.	1.30	/ 1.90
-392	gal.	1.55	/ 2.15
CW-12	lb.	.85	
37	lb.	.70	
Darex Copolymer Latices	lb.	.365	/ .50
Dispersed Sulfur No. 2	lb.	.10	/ .12
Factice dispersions	lb.	.26	/ .42
Gelling Agent P-397	lb.	.34	/ .37
Habuco Resin Emulsion			
#226	lb.	.227	/ .232
2246-A	lb.	.275	/ .28
3408-B	lb.	.18	/ .19
Laton L	lb.	.075	/ .0775
Ludox	lb.	.1675	/ .1925
Marmix	lb.	.41	/ .48
Micronex, colloidal	lb.	.06	/ .07
Pliolite Latex 150, 190	lb.	.32	/ .41
170	lb.	.37	/ .46
Resin Emulsion A-2	lb.	.16	/ .25
A-155TH	lb.	.195	/ .265
P-370	lb.	.125	/ .175
X-210	lb.	.12	/ .32
Resin V	lb.	.13	
Santomerse D	lb.	.44	/ .65
S	lb.	.13	/ .25
Stablex A	lb.	.80	/ 1.10
B, G	lb.	.50	/ .95
K	lb.	.27	/ .35
P	lb.	.35	/ .50
T	lb.	.17	/ .22
Sulfur dispersions	lb.	.12	/ .25

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE: ERIE ALL-STEEL HYDRAULIC PRESS: 18" STROKE. (4) Pistons 12" diameter, chrome plated. (4) Strain Rods 6" dia. (7) Rolled steel platens, 54" x 65", 2½" thick. Eight openings. Front and rear hydraulic lift tables. Address Box No. 1203, care of INDIA RUBBER WORLD.

FOR SALE: FARREL 16" X 48" AND 15" X 36", 2-ROLL RUBBER mills, also new lab. 6" x 12" & 6" x 16" Mixing Mills and Calenders, & other sizes up to 84". Extruders 1" to 3". Baker-Perkins Mixers 100, 50, 9, and 4½ gals., heavy-duty double-arm. Ball & Jewell & Leominster Rotary Cutters. HPM 200-ton vert. Hydraulic Press, 4-opening upstroke, 32" x 50" platens. Large stock of Hydraulic Presses from 12" x 12" to 48" x 48" platens from 50 to 2,000 tons. Hydraulic Pumps and Accumulators. Crushers, Churns, Rubber Bale Cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 107 — 8th St., Brooklyn 15, N. Y. STerling 8-1944.

REBUILT BANBURY BODIES AND PARTS FOR SALE OR INterchange. Sizes #9 and #11 complete bodies available. Extra parts include rotors, door tops, and rings. We rebuild all sizes of Banburys and can also fabricate any parts needed. Our "Pre-Plan" rebuilding method saves your production time. Write for prices and details. INTERSTATE WELDING SERVICE, Offices, Metropolitan Bldg., Akron 8, Ohio.

SPECIAL OFFERINGS

1—Farrel-Birmingham 6" x 12" Laboratory Washer Mill, m.d.
1—Farrel 16" x 42" Rubber Mill, m.d.
1—Farrel-Birmingham 6" x 13" self-contained 3-roll Calender, m.d.
4—Bolling 18" x 18", 5-opening, Hydraulic Presses.
1—Ferriot 24" Hydraulic Stock Cutter.
1—Farrel 36" Cracker Mill.
1—Royle #4, 6" Extruder, also Royle #½.
2—AMF 340-qt. Glen Mixers.

Also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters. Send us your inquiries.

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CONSOLIDATED PRODUCTS COMPANY, INC.

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BArclay 7-0600

We Buy Your Idle Equipment

AIR COMPRESSOR

1 — Ingersoll Rand size 14½ x 14½ x 10 class XRE single stage, direct conn. air compressor, 35# pressure with 5-step clearance control, 150 H.P., 360 R.P.M., 440-volt, 3-phase, 60 cycle, 80% power factor, 50° C. engine type synchronous motor, complete with all auxiliary equipment. New 1950.

DALTON SUPPLY CO.

2829 Cedar Street Philadelphia 34, Pa.

RUBBER MACHINERY
Buys of the month . . . . .

MILLS

24 x 84"
22 x 72"
22 x 60"
22 x 48" (heavy duty)
18 x 45" (several)
16 x 40" (several)
18 x 30" (several)
16 x 30"
16 x 24"
10 x 24"
8 x 18"
6 x 12" (used lab)
6 x 12" (new lab)

CALENDERS

32 x 92" 4-roll
24 x 66" 3-roll
22 x 60" 3-roll
18 x 54" 3-roll
16 x 40" 3-roll
12 x 30" 4-roll
10 x 20" 3-roll
6 x 12" 3-roll (new lab)

HYDRAULIC PRESSES

36 x 36" with 30" ram
30 x 54" with 30" ram
24 x 24" with 12" ram
24 x 24" with 14" ram
24 x 24" with 18" ram, 2 opening, new, available immediately (2)
30 x 30" with 16" ram
48 x 48" with four 14" rams, 8 openings
12 x 12" with all size rams

WE ALSO FURNISH NEW ARMACO PRESSES OF THE FOLLOWING SIZES:

12 x 12" 32 x 32"
18 x 18" 36 x 36"
24 x 24" 42 x 42"
48 x 48"

Also larger sizes, all presses having large diameter rams.

BANBURY MIXERS

Sizes No. B, 1, 3, 3A, 9, 11

EXTRUDERS

1", 2", 3¼", 4½", 6", 8", 12"
All with motors and drives

NOTE: We have available five complete rubber plants for sale in different parts of the country.

FOR THE BEST DEAL IN NEW AND USED RUBBER WORKING MACHINERY, CALL US OR STOP IN AT OUR NEW LOCATION CLOSE TO DOWNTOWN AKRON.

AKRON RUBBER MACHINERY CO.

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Economical **NEW** Efficient

Mills - Spreaders - Churns
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Rebuilt Machinery for Rubber and Plastics

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NEW and REBUILT MACHINERY

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GUARANTEED REBUILT MACHINERY

IMMEDIATE DELIVERIES FROM STOCK

MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS
HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS

UNITED RUBBER MACHINERY EXCHANGE

183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

Mold Lubricants

Aquarex Compounds	lb.	$0.28	/ $0.97
Colite Concentrate	gal.	.90	/ 1.15
ELA	lb.	.825	
DC Mold Release Fluid	lb.	4.14	/ 6.00
Emulsion Nos. 35, 35A, 35B	lb.	1.68	/ 3.50
DC 7	lb.	6.20	/ 6.80
Glycerized Liquid Lubricant, concentrated	gal.	1.48	
Lubrex	lb.	.25	/ .30
Lubri-Flo	gal.	10.00	/ 12.05
Mold Paste	lb.	.25	
Monten Wax	lb.	.57	
Para Lube	lb.	.046	/ .048
Rubber-Glo	gal.	.94	/ .97
Soap, Hawkeye	lb.	1.35	/ 1.45
Purity	lb.	.155	/ .165
Sodium stearate	lb.	.43	/ .44
Stearite	lb.	.095	/ .10
Vanfre	gal.	2.50	/ 3.00

Odorants

Alamasks	lb.	.75	/ 6.50
Curodex 19	lb.	4.75	
188	lb.	5.75	
198	lb.	6.75	
Rodo No. 0	lb.	4.00	/ 4.50
No. 10	lb.	5.00	/ 5.50

Plasticizers and Softeners

Akroflex C	lb.	.695	/ .715
Aro Lene #1980	lb.	.10	/ .12
Baker AA Oil	lb.	.26	/ .32
Crystal O Oil	lb.	.275	/ .335
Processed oils	lb.	.28	/ .315
Bardol	lb.	.025	/ .035
639	lb.	.025	/ .0425
B	lb.	.0575	/ .06
Bondogen	lb.	.55	/ .60
BRC 20	lb.	.015	/ .016
30	lb.	.0115	/ .02
521	lb.	.019	/ .02
B. R. H. No. 2	lb.	.02	/ .029
B. R. S. 700	lb.	.0175	/ .026
B. R. T. No. 7	lb.	.0265	/ .0275
B. R. V.	lb.	.035	/ .0515
Bunarex Liquid	lb.	.0425	/ .0555
Resins	lb.	.065	/ .1225
Bunnatol G. S.	lb.	.40	/ .505
Butac	lb.	.125	/ .135
BxDC	lb.	.40	/ .41
Cabflex DI-BA	lb.	.42	/ .4475
-OA	lb.	.435	/ .4625
-OP	lb.	.40	/ .4275
Carbonex	lb.	.0325	/ .0375
664	lb.	.0375	/ .0425
645	lb.	.036	/ .0385
S	lb.	.0425	/ .0475
S Plastic	lb.	.041	/ .046
Chlorowax 40	lb.	.16	/ .17
Contogums	lb.	.0875	/ .111
Cumar EX	lb.	.0525	
MH	lb.	.065	/ .11
V	lb.	.0975	/ .1275
Diclex B	lb.	.06	
Dipolymer Oil	gal.	.33	/ .38
Dispersing Oil No. 10	lb.	.055	/ .0575
Duraplex C-50 LV, 100%	lb.	.25	/ .295
Dutrex 6	lb.	.025	/ .035
Galex W-100	lb.	.135	/ .1725
W-100D	lb.	.1325	/ .17
Gilsowax B	lb.	.09	/ .11
Good-rite GP-261	lb.	.40	/ .52
GP-263	lb.	.45	/ .585
Harchemex	lb.	.3025	/ .39
Harflex 500	lb.	.36	/ .3875
Heavy Resin Oil	lb.	.0225	/ .0375
HSC-13	lb.	.27	/ .30
Indonex	gal.	.11	/ .19
Marvinol plasticizers	lb.	.28	/ .8825
Morflex plasticizers	lb.	.35	/ .725
Nebony resins	lb.	.04	/ .045
Nevillac	lb.	.28	/ .55
Neville R. Resins	lb.	.13	/ .35
Nevinol	lb.	.20	
Nevoll	lb.	.025	/ .035
Nevtex resins	lb.	.11	/ .48
No. 1-D heavy oil	lb.	.055	/ .065
Palmalene	lb.	.15	
Paraflex BN-1	lb.	.185	/ .225
Para Flux, regular	gal.	.1925	/ .2125
No. 2016	gal.	.165	/ .24
2332	gal.	.11	
Para Lube	lb.	.046	/ .048
Resins	lb.	.04	/ .045
Paradene Resins	lb.	.065	/ .075
Peptizene #2	lb.	.90	
Pepton 22	lb.	.745	/ .775
Picco Resins	lb.	.13	/ .185
480 Oilproof Series	lb.	.18	/ .23
S. O. S.	gal.	.29	/ .34
Piccocizers	lb.	.04	/ .068
Piccolastic Resins	lb.	.1855	/ .34
Piccolyte Resins	lb.	.185	/ .25
Piccopale Resins	lb.	.12	/ .135
Piccoumaron Resins	lb.	.07	/ .185
Piccovars	lb.	.145	/ .20
Piccovol	lb.	.025	/ .038
Pictar	gal.	.25	/ .30
Pigmentar	gal.	.041	/ .0678
Pigmentaroil	gal.	.041	/ .0678
Plastender S	lb.	.04	/ .0425
Plasticizer 35	lb.	$0.205	/ $0.24
36	lb.	.305	/ .34
42	lb.	.34	/ .40
B	lb.	.35	/ .45
DP-520	lb.	.435	/ .455
MT-511	lb.	.535	/ .565
ODN	lb.	.32	/ .37
PX series	lb.	.385	/ .75
SC	lb.	.61	/ .69
Plastogen	lb.	.0775	/ .08
Plastone	lb.	.22	/ .30
Polycizers	lb.	.40	/ .4775
Polymel 6	lb.	.07	/ .075
7	lb.	.14	
D Resin	lb.	.253	/ .24
Gilsowax B	lb.	.0925	/ .1025
Resin C-130	lb.	.195	/ .205
PT67 Light Pine Oil	gal.	.50	/ .60
101 Pine Tar Oil	lb.	.041	/ .0534
400 Light Pine Tar	lb.	.041	/ .0534
600 Med. Pine Tar	lb.	.041	/ .0534
R-19, R-21 Resins	lb.	.1075	
Reogen	lb.	.1325	/ .135
Resin C pitch	lb.	.02	/ .0285
R6-3	lb.	.38	/ .40
Resinex	lb.	.0325	/ .0375
L-4	lb.	.0225	/ .03
Rosin Oil, Sunny South	gal.	.58	/ .875
RPA No. 2	lb.	.775	
No. 3 RO	lb.	.49	
5	lb.	.57	
RSN Flux	gal.	.10	/ .19
Rubber Oil B-5	lb.	.0225	/ .0355
Rubberol	lb.	.2575	
Santicizer 107	lb.	.40	/ .4775
140	lb.	.3525	/ .43
141	lb.	.40	/ .4775
160	lb.	.33	/ .4075
Seedine	lb.	.1485	/ .1705
Softener #20	gal.	.10	/ .20
Special Rubber Resin 100	lb.	.1675	/ .2175
Starex Beads	lb.	.14 7/8	/ .15 7/8
Starite	lb.	.095	/ .10
Syn-Tac	gal.	.33	/ .35
Synthol	lb.	.2475	
Thiokol TP-90B	lb.	.59	/ .69
-95, -98	lb.	.65	
TR-11	lb.	.035	
Turgum S	lb.	.1075	/ .1175
Tysonite	lb.	.215	/ .2225
X-1 Resinous Oil	lb.	.021	/ .0275
XX-100 Resin	lb.	.0525	

Reclaiming Oils

Bardol	lb.	.025	/ .035
639	lb.	.025	/ .0425
B	lb.	.0575	/ .06
B. R. H. No. 2	lb.	.02	/ .029
B. R. T. No. 4	lb.	.0225	/ .0235
B. R. V.	lb.	.035	/ .0515
Burco-RA	lb.	.055	/ .0825
BWH-1	lb.	.14	
Dipolymer Oil	gal.	.33	/ .43
Dispersing Oil No. 10	lb.	.055	/ .0575
Heavy Resin Oil	lb.	.0225	/ .0375
LX-759	gal.	.16	/ .165
-774, -777	gal.	.23	/ .33
No. 1621	lb.	.025	/ .035
3186	gal.	.28	/ .295
Picco 6535	gal.	.25	/ .30
C-33	gal.	.215	/ .315
-42	gal.	.23	/ .33
D-4	gal.	.27	/ .37
E-5	gal.	.25	/ .35
Q-Oil	gal.	.286	/ .36
PT 101 Pine Tar Oil	lb.	.041	/ .0534
150 Pine Solvent	gal.	.44	/ .553
Reclaiming Oil #3186	gal.	.28	/ .385
-G	gal.	.25	/ .365
RR-10	lb.	.36	
S. R. O.	lb.	.015	/ .0225
X-1 Resinous Oil	lb.	.021	/ .0275

Reinforcers, Other Than Carbon Black

BRC 20	lb.	.015	/ .016
30	lb.	.0115	/ .02
521	lb.	.019	/ .02
Bunarex resins	lb.	.065	/ .1225
Calcene NC	ton	72.50	/ 92.50
TM	ton	75.00	/ 95.00
Calco S. A.	lb.	.85	/ .88
Carbonex	lb.	.0325	/ .0375
644	lb.	.0375	/ .0425
645	lb.	.036	/ .0385
S	lb.	.0425	/ .0475
S Plastic	lb.	.041	/ .046
Clays			
Aiken	ton	14.00	
Aluminum Flake	ton	23.50	/ 60.00
No. 5	ton	21.85	/ 36.00
22	ton	17.00	/ 22.50
Buca	ton	40.00	
Burgess Iceberg	ton	50.00	
Pigment No. 20	ton	35.00	
30	ton	37.00	
Catalpo	ton	30.00	
Crown	ton	14.00	/ 33.00
Dixie	ton	14.00	
Hydratex R	ton	28.00	
L. G. B.	ton	17.00	
Paragon (R)	ton	13.50	/ 31.50
Pigment No. 33	ton	30.00	
Suprex	ton	14.00	/ 32.00
Witco No. 1	ton	14.00	/ 30.00
No. 2	ton	13.50	/ 30.00
Clearcarb	lb.	.1175	/ .1225
Cumar EX	lb.	.0525	
MH	lb.	.065	/ .1175
V	lb.	.0975	/ .1275
Darex Copolymers	lb.	$0.38	/ $0.44
G Resin	lb.	.08	
Good-rite Resin 50	lb.	.41	/ .44
Hi-Sil	lb.	.10	/ .115
Kralac A	lb.	.43	/ .54
Magnesium oxide	lb.	.05	/ .34
Marbon resins	lb.	.41	/ .48
Multiflex MM	ton	110.00	/ 125.00
Neville R. Resins	lb.	.10	/ .155
Para Resins 2457, 2718	lb.	.04	/ .45
Pico Resins	lb.	.13	/ .185
Piccolyte Resins	lb.	.185	/ .25
Piccoumaron Resins	lb.	.07	/ .185
Piccovars	lb.	.145	/ .20
Pliolite S-3, -6, -6B	lb.	.42	/ .49
S-6C	lb.	.52	/ .59
S-Master batches	lb.	.44	/ .75
PS-60 Resin	lb.	.35	
Purecal U	ton	120.00	135.00
Resin C Pitch	lb.	.02	/ .0285
Resinex	lb.	.0325	/ .0375
Rubber Resin LM-4	lb.	.28	/ .35
S-Polymers	lb.	.44	
Silene EF	ton	120.00	/ 140.00
Silvacons	ton	55.00	/ 85.00
Super Multifex	ton	160.00	/ 175.00
Witcarb R	ton	105.00	/ 120.00
R-12	ton	45.00	/ 66.00
Zinc oxide, commercial†	lb.	.1425	/ .175

Retarders

Cumar RH	lb.	.105	
Delac J	lb.	.55	/ .60
E-S-E-N	lb.	.35	/ .37
Good-rite Vultrol	lb.	.58	/ .60
R-17 Resin	lb.	.1075	/ .36
Retarder ASA	lb.	.57	
PD	lb.	.35	/ .37
TCM	lb.	.65	
W	lb.	.445	
Retardex	lb.	.47	/ .50
RM	lb.	1.25	
Thionex	lb.	1.25	

Solvents

2-50-W Hi-Flash Solvent	gal.	0.41	
3-BX Naphtha	gal.	.37	
Bondogen	lb.	.55	/ .60
Cosols	gal.	.37	/ .48
Dichloro Pentanes	lb.	.04	/ .07
Dipentene DD	gal.	.445	/ .68
GVL	lb.	1.00	
LX-572 Oil	gal.	.27	/ .32
-748 Solvent	gal.	.16	/ .23
Penetrell	gal.	.445	/ .68
Picco Hi-Solv Solvents	gal.	.17	/ .24
Pine Oil DD	gal.	.755	/ .955
PT 150 Pine Solvent	gal.	.44	/ .55
Skellysolve-E	gal.	.153	
-H	gal.	.133	
-R, -V	gal.	.109	
-S	gal.	.099	
Tollac	gal.	.195	/ .25

Synthetic Resins

Geon Latices (dry wt.)	lb.	.43	/ .57
Paste Resins	lb.	.38	/ .59
Plastics	lb.	.42	/ .77
Polyblend	lb.	.475	/ .575
Polyvinyl resins	lb.	38	/ .70
Kenflex A, L	lb.	.26	
B	lb.	.23	
N	lb.	.18	
Marvinol VR-10, -20	lb.	.36	/ .52

Synthetic Rubber and Latices

Butaprene Latex (dry wt.)			
NL types	lb.	.47	/ .52
NXM types	lb.	.55	/ .60
Butaprene NAA	lb.	.54	/ .55
NF	lb.	.49	/ .50
NL	lb.	.50	/ .51
NXM	lb.	.58	/ .59
Chemigum 30N4NS, 50N4NS	lb.	.50	/ .57
N1NS	lb.	.64	/ .71
N3NS	lb.	.58	/ .65
Latex (dry wt.)			
101-A, -AX, -E	lb.	.32	/ .41
200	lb.	.425	/ .525
235-A, -B	lb.	.50	/ .60
245-A, -B	lb.	.425	/ .525
Hycar OR-15, -15EP	lb.	.58	/ .59
-15 Powdered	lb.	.621	/ .63
-25, -25 EP	lb.	.50	/ .51
-25 NS	lb.	.51	/ .52
-25 ST	lb.	.61	/ .62
OS-10	lb.	.55	/ .56
Hycar Latex (dry wt.)			
OR-15 types	lb.	.55	/ .60
-25 types	lb.	.47	/ .52
Neoprene Latex (dry wt.)			
Type 571, 842-A	lb.	.35	/ .46
572, 700	lb.	.36	/ .47
601-A	lb.	.38	/ .49
735	lb.	.36	/ .47
Neoprene Type AC, CG	lb.	.50	/ .53
KNR	lb.	.75	/ .78
GN, GN-A, S	lb.	.38	/ .41
GRT, W, W-P	lb.	.40	/ .43
Q	lb.	1.00	/ 1.03
WRT, WRT-P	lb.	.45	/ .48
Paracril 18-80	lb.	.60	/ .61
AJ	lb.	.485	/ .495

RUBBER FACTORY discontinued operation

Complete equipment for moulding business including —

17—24 x 24 hyd. presses
5—36 x 36 " "
1—30 x 30 " "
1—hyd. rubber bale cutter
69—mat moulds including household and automobile
2—Injection moulding machines

and many other pieces of rubber machinery. All equipment on premises and available for inspection.

ADDRESS BOX NO. 1188, c/o INDIA RUBBER WORLD

FOR SALE: #3 BANBURY WITH 75 H.P. MOTOR. ADDRESS Box No. 1214, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES WANTED

WANTED—TO EXPEDITE PRODUCTION—RUBBER MAKING machinery including Banbury Mixers, Heavy-Duty Mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a set-up plant now operating or shut down. When offering, give full particulars. P. O. Box 1351, Church Street Sta., New York 8, N. Y.

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WANTED: #3A OR #9 BANBURY MIXER. STATE PRICE AND condition. Address Box No. 1213, care of INDIA RUBBER WORLD.

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Surplus capacity available to customers' specifications on No. 3A Banbury Type Machine. We are manufacturers of Molded, Lathe Cut, and Extruded Soft Rubber Goods and have surplus mixing capacity.

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1—Banbury #9 Mixer.
1—Banbury #1 Mixer with 50 HP Motor.
1—Baker Perkins Laboratory Size 6, Class BB, 2 Gal. Internal Rubber Mixer.
2—Thropp 2-Roll Rubber Mills, 18" x 50".
1—Thropp 2-Roll Rubber Mill, 14" x 30".
1—Thropp 3-Roll Rubber Calender, 18" x 54".
1—Royle #5 Rubber Strainer with 125 HP Motor & Drive
1—Ball & Jewell Stainless Steel #0 Rotary Cutter with Motor & Starter.
1—Paul O'Abbe #2 Master Rotary Cutter with Ball Bearings.
1—Adamson Vulcanizer, 2' x 12', with quick opening door, 150 lbs. W. P.
5—Cleveland Worm Gear Reducers, Size 800 AT, Series 24B, 1200 RPM, 8-1 Ratio, 75 H. P.

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Paracril			
B, BJ	lb.	$0.50	/ $0.51
BV	lb.	.51	/ .52
C	lb.	.58	/ .59
CS, CV	lb.	.59	/ .60
Paraplex X-100	lb.	1.00	/
Silastic	lb.	2.35	/ 4.05
Thiokol LP-2, -3	lb.	.96	
-8	lb.	1.25	
PR-1	lb.	1.95	
Type A	lb.	.47	
FA	lb.	.64	
ST	lb.	1.00	
Thiokol Latex (dry wt.)			
Type MF	lb.	.85	
MX	lb.	.70	
WD-2	lb.	.92	
-6	lb.	.70	

Tackifiers

Bunarex resins	lb.	.065	/ .1225
Chlorowax 70	lb.	.18	/ .19
Contogums	lb.	.0875	/ .11
Galex W-100	lb.	.155	/ .1925
W-100D	lb.	.1525	/ .19
Indopol H-100	gal.	.85	/ 1.00
H-300	gal.	1.00	/ 1.16
Natac	lb.	.12	/ .13
Nevindene	lb.	.125	/ .155
Picco Pesins	lb.	.13	/ .185
Piccolastic Pesins	lb.	.1855	/ .34
Piccolyte Pesins	lb.	.185	/ .25
Piccopale Pesins	lb.	.12	/ .135
Piccoumaron resins	lb.	.07	/ .185
Synthetic 100	lb.	$0.41	
Synthol	lb.	.2475	
Vistac #1	lb.	1.00	/ $1.16
A	lb.	.215	/ .2725
P	lb.	.18	/ .235

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.585	
G-M-F #113	lb.	.88	
G-M-F-	lb.	2.585	
#117	lb.	.88	
Ko-Blend I. S.	lb.	.385	
Litharge, commercial	lb.	.1725	/ .1735
Eagle, sublimed	lb.	.1725	/ .1735
National Lead	lb.	.1725	/ .1735
Magnesium oxide	lb.	.31	
Red lead, commercial	lb.	.1725	/ .1875
Eagle, National Lead	lb.	.1825	
Sulfasan R	lb.	1.50	
Sulfur flour, comml.	100 lbs.	2.05	/ 2.20
Calco	100 lbs.	2.15	/ 7.50
Crystex	lb.	.195	
Insoluble 60	lb.	.125	/ .13
Rubbermakers	100 lbs.	2.25	/ 3.80
Stauffer	lb.	.0215	/ .0335
Telloy	lb.	2.50	
Vandex	lb.	3.50	
Vultac No. 2	lb.	.47	/ .6025
3	lb.	.51	/ .655
White lead silicate	lb.	.15	/ .1925
Eagle	lb.	.175	/ .1925
National Lead	lb.	.15	/ .16

United States Rubber Statistics — August, 1952

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	62,455	62,455	28,589	373	75,549
Latex, total	0	4,684	4,684	4,352	0	9,108
Rubber and latex, total	0	67,139	67,139	32,941	373	84,657
Synthetic rubbers, total	*53,472 †5,742	1,612	60,826	61,214	1,887	150,254
GR-S types‡	*47,167 †4	1,453	48,624	50,709	423	112,372
Butyl	*6,305	159	6,464	5,012	5	25,141
Neoprene‡	†4,610	0	4,610	4,383	1,107	9,293
Nitrile types‡	†1,128	0	1,128	1,110	352	3,448
Natural rubber and latex, and synthetic rubbers, total	59,214	68,751	127,965	94,155	2,260	234,911
Reclaimed rubber, total	17,131	60	17,191	20,548	813	32,224
GRAND TOTALS	76,345	68,811	145,156	114,703	3,073	267,135

* Government plant production.
† Private plant production.
‡ Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	July, 1952 Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	102,407,989	$30,026,066
Latex	6,991,095	2,378,572
Guayule	923,299	153,855
Balata	124,008	35,941
Jelutong or Pontianak	224,054	148,350
Gutta percha	35,785	18,422
Crude chicle	140,685	86,774
Synthetic rubber	3,262,384	834,803
Reclaimed rubber	280,528	18,171
Scrap rubber	1,133,157	63,259
TOTALS	115,522,984	$33,764,213
MANUFACTURED		
Rubber tires		
Auto, etc. no.	4,533	$360,763
Bicycle no.	2,546	3,199
Other no.	76	1,619
Inner tubes: auto, etc. no.	299	2,527
Footwear		
Boots prs.	26,430	63,562
Shoes and overshoes prs.	30,544	43,133
Rubber-soled canvas shoes prs.	9,914	5,983
Rubber athletic balls		
Golf no.	$6,680	$2,322
Tennis no.	77,280	5,314
Other no.	8,272	841
Toys	......	30,921
Hard rubber goods		
Combs no.	7,632	685
Sundries	.....	1,827
Other	.....	4,291
Rubberized printing blankets lbs.	996	2,318
Rubber and cotton packing lbs.	3,735	6,797
Gaskets and valve packing	.....	6,748
Molded insulators	.....	3,367
Belting lbs.	1 002	2,493
Hose and tubing	.....	2,883
Gloves prs.	27,039	7,071
Nipples and pacifiers gr.	1,900	2,145
Instruments doz.	2,980	5,228
Other rubber products	.....	21
Gutta percha manufactures lbs.	5,412	6,033
Rubber bands lbs.	1,128	1,083
Other soft rubber goods	.....	66,001
TOTALS	.....	$635,175
GRAND TOTALS, ALL RUBBER IMPORTS	.....	$34,399,388

Exports of Domestic Merchandise

	July, 1952 Quantity	Value
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	334,517	$160,508
Synthetic rubbers		
GR-S types	2,087,803	494,166
Neoprene	765,125	309,446
Nitrile types	432,375	223,965
Other, except butyl	71,988	50,277
Reclaimed rubber	1,646,315	160,017
Scrap rubber	2,229,839	75,495
TOTALS	7,567,962	$1,473,874
MANUFACTURED		
Rubber cement gals.	47,857	97,342
And rubberized fabric sq. yds.	123,288	106,442
Rubberized clothing	.....	182,301
Footwear		
Boots and shoes prs.	14,508	49,523
Rubber-soled canvas shoes prs.	15,051	31,386
Heels doz. prs.	37,400	44,653
Soles, soling and toplift sheets lbs.	483,224	137,890
Gloves and mittens doz. prs.	9,508	40,964
Drug sundries	.....	152,385
Toys, balls, novelties	.....	39,788
Hard rubber goods		
Battery boxes no.	16,523	29,429
Other electrical lbs.	59,620	38,498
Other	.....	23,079
Rubber tires and casings		
Truck and bus no.	53,819	2,839,657
Auto no.	86,240	926,696
Aircraft no.	1,205	70,797
Off-the-road no.	13,983	1,732,066
Farm tractor no.	6,017	276,198
Farm implement no.	4,840	53,772
Other no.	11,985	117,098
Inner tubes		
Auto no.	66,938	106,405
Truck and bus no.	67,227	239,221
Aircraft no.	1,473	10,628
Other no.	17,504	73,784
Solid tires: truck and industrial no.	2,381	43,389
Tire repair materials		
Camelback lbs.	464,273	166,076
Other lbs.	435,696	379,229
Tape, except medical and friction lbs.	27,286	29,462
Belting		
V-type auto lbs.	71,628	100,687
Transmission		
V-belts lbs.	67,625	161,140
Flat belts lbs.	28,717	44,576
Conveyor and elevator lbs.	123,707	126,540
Hose		
Molded and braided lbs.	421,134	351,372
Wrapped and hand built lbs.	152,931	169,233
Other hose and tubing lbs.	164,034	171,772
Packing: sheet type lbs.	40,948	28,639
Other lbs.	154,723	176,800
Tiling and flooring lbs.	58,567	15,896
Mats and matting lbs.	813,784	221,386
Thread: bare lbs.	8,479	16,945
Textile covered lbs.	8,451	27,931
Compounded rubber for further manufacture lbs.	1,161,274	330,173
Other rubber manufactures	.....	507,282
TOTALS	.....	$10,488,530
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$11,962,404

Reexports of Foreign Merchandise

	Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	303,900	$128,437
Chicle and chewing gum bases	2,000	650
GR-S type: synthetic rubber	7,730	4,079
Scrap rubber	10,032	4,715
TOTALS	323,662	$137,881
MANUFACTURED		
Rubber gloves and mittens doz. prs.	50	$155
Drug sundries	.....	143
Toys, balls, novelties	.....	618
Conveyor and elevator belting lbs.	341	489
Other manufactures	.....	1,154
TOTALS	.....	$2,559
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$140,440

SOURCE: Bureau of the Census, United State Department of Commerce, Washington, D. C.

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